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ABSTRACT

Observational instruments were developed for measuring the visual attention and verbal reactions of children watching "The Electric Company." Using the instruments, ten primary school classrooms, representing a broad range of classroom structures, were observed five or six times. The measures of attention proved to be reliable, and results showed children to be attentive regardless of ability. Those in the top and bottom quartiles exhibited slightly less observable reading behavior. Other findings indicated: (1) that all children showed less attention when placed among children of low reading ability; (2) that written messages on the television screen were more likely to be read when not accompanied by voice-over; and (3) children were more attentive in structured classrooms. This report describes the observational instruments and sample selection, presents tabular summaries of observations, and discusses the results. (EMH)

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Watching Children Watch
"The Electric Company":
An Observational Study
in Ten Classrooms

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Courtney B. Cazden*
Harvard University

*with Russel Andrews, Milton Chen, Louise Cherry, Diana Darr, Barbara Flagg, Ellen Kattef, David Lubin, Ellen Rosansky, David Rose, Nikki Smith, and Elizabeth Westcott.

Final report to Children's Television Workshop
August, 1973

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Watching Children Watch "The Electric Company":

An Observational Study in Ten Classrooms

Summary

Observational instruments were developed for measuring the viewing behavior of children watching "The Electric Company" in their classroom. Viewing behavior is defined as visual attention and verbalizations. These instruments were then used in an observational study to explore patterns of viewing behavior and their relationship to classroom structure and to children's reading ability.

Ten primary classrooms were observed 5 or 6 times. Three observers were present at each visit: one group observer who scanned the class at 30-second intervals for percent attending to "The Electric Company"; and 2 individual observers, who each watched one child, recording his attention on an event recorder and recording by hand all his audible verbalizations related to the show.

Monitoring individual attention on the event recorder was extremely reliable (.936 inter-observer agreement), and obtaining group attention averages from 30-second scans had high validity (average correlation of .94 between group and individual attention). Coding verbalizations was more difficult; (inter-observer reliability for reading responses attained only .84).

The 10 classrooms were selected to represent a range of classroom structure--defined here as a continuum from attention to TEC expected and enforced by the teacher ("high" structure) to the availability of a range of competing activities ("low" structure). Classroom structure is positively related to both group attention (correlation .87) and individual attention (correlation .95). With the exception of one classroom, which is discussed, structure also correlates highly with average number of reading responses (correlation of .90 for 9 classes but .38 for all 10).

Children's reading ability can be categorized according to their relative standing in their class (high, middle or low reading group) or more absolutely according to standardized test scores. When children are categorized according to relative standing in their class, there is no significant difference between high and low readers in either average attention or average number of reading responses. But when the children are categorized on the basis of standardized reading test scores, a definite pattern emerges: children in the two middle quartiles watch more and read more than either the bottom or the top quartile. The lower amount of overt reading of the most able

readers may be due to their decreased attention to the show, or to more subvocal reading, or both. The average attention of the children in the lowest reading quartile (79%), while lower than the 90% attention of the third quartile, is nevertheless encouraging evidence that TEC is effectively reaching its intended audience.

A surprising and unexplained finding is that, without exception, children of the same tested reading level show less attention, and more fluctuations in attention (more distractions), when they are among the lowest readers in their class than when they are in relatively higher reading groups.

There are no significant differences in attention or reading responses between boys and girls.

Reading level of the child and the structure of his classroom environment are additive; high structure affects all children, increasing their attentiveness and responsiveness to TEC to such an extent that it more than compensates for lower reading levels; poorer readers in high structured classrooms have higher attention, more reading responses and fewer fluctuations than better readers in low structured classrooms.

While the primary purpose of this research was the measurement of viewing behavior, and not comparison of TEC show segments, we did look at the ratio of "actual" reading responses made by children to the "potential" reading responses presented as print on the screen. Potential reading responses were divided into those accompanied by a simultaneous voice-over vs. those where the voice-over was delayed or not heard at all. In the six shows we analysed, from 2/3 to almost 8/9 of potential reading responses are accompanied on the show by a simultaneous voice-over. But reading opportunities which are not accompanied by a voice-over are at least twice as likely to be read by the 19 children we observed.

In additions to these 10 classrooms, one member of the research group observed in two other second grades where the teachers used the show in a very different way: they expected the children to write down as many words from the TV screen as possible. In these two classrooms, potential reading responses thus became actual writing responses by these children. In these two classrooms, similar to each other at the very high end of the classroom structure continuum, there were differences in children's patterns of attention, number of words written, and enjoyment of the show. In these two classes, and in the exception to the generally high correlation between structure and reading in the 10 classes discussed earlier, the more objective variable of classroom structure itself seems to interact with subjective aspects of the teacher's interpersonal style.

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Watching Children Watch "The Electric Company": An Observational Study in Ten Classrooms

Introduction

The purpose of this research was to develop a valid and reliable instrument for observing children's viewing behavior as they watch "The Electric Company" (TEC) in their elementary school classrooms. By viewing behavior, we mean both visual attention and verbalizations.

For TEC, whose goal is to help children learn to read, visual orientation to the TV screen can be assumed to be necessary for learning. Many of the things taught on other television programs, including "Sesame Street," can be learned or at least partly learned through the auditory mode alone, or with only occasional orientation to the screen. But because reading is a response to visual stimuli, there is a firmer justification for equating attention with visual orientation. At least visual orientation would seem to be critical, even if not sufficient.

Also in contrast to "Sesame Street," verbalizations are more intrinsically related to the objectives of TEC. Overt responses--to letters, words and sentences--do not define "reading," even in the beginning stages. We hope that TEC can influence the more covert mental processes which reading requires. But we have no way to tap them, and overt responses remain a more valid indicator of the subjective processes we hope to teach than would hold for non-reading objectives.

A secondary purpose of the research was to conduct an observational study with the instrument in a few classrooms--to test the observational instrument and obtain at least preliminary substantive data on patterns of viewing behavior.

In the course of instrument development a pilot study was done in five classrooms. Subsequently, a fuller study was done in 10 classrooms, with occasional references to procedures and results from the smaller pilot study.

Observational Instruments

Our methodological task was to develop two instruments which could be used simultaneously by a pair of observers in a single classroom. One would yield a general picture of the visual attention of the group as a whole and the role of the teacher during the program; the other would focus more intensively on an individual child and record verbalizations as well as attention.

For both instruments, we used observation sheets made up for each show from the program sheets supplied by Children's Television Workshop (CTW). These sheets listed program segments by name and time in the first column, and further indicated segment duration by the appropriate number of rows, to the nearest 30 seconds. So a 15-second segment had one row, and a 2-minute-10-second segment had five rows. Group observation sheets were used by the group observer for recording group attention and writing descriptions of child and teacher behavior. Similar sheets were used by observers of individual children for recording verbalizations.

Two machines were used: a beeper worn by the group observer which timed the scanning for group attention at 30-second intervals, and an event recorder* which made possible continuous and reliable monitoring of the attention of individual children. Following are more detailed descriptions of both group and individual observations.

Group Observation Procedures

The group observer (GO) had three tasks: keeping a record of the attention of the entire class at 30-second intervals, making notes on child and teacher behavior, and marking the segmentation of TEC into show segments on the event recorder.

Group Attention. GO wore a battery-operated beeper with an earphone which sounded into his** ear at 30-second intervals. At each beep, GO scanned the class, counted the number of children watching TEC at that moment, and recorded the number in the appropriate row on the group observation sheet. Because the number of children physically present in the room did not always remain constant throughout the show, the number attending was always recorded as a fraction of the number present: 18/20, 18/19, 13/19, etc. This notation made the subsequent computation of average percent attention for each class much easier.

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*Event recorder, Model 292-8, available from Russtrack Instrument Division, Gulton Industries, Manchester, New Hampshire.

**Because the teachers were all female, while observers were both male and female, the chronic problem of gender will be solved here by using feminine pronouns for teachers and male pronouns for observers.

Before TEC started, GO recorded on the group observation sheet the teacher's name, the number of children in attendance that day, a brief description of the class's activity prior to show-time, the nature of the transition to watching TEC, and a description in words or diagram of the physical viewing arrangement. Potentially important to group attention were: the accessibility of the TV screen to all the children's viewing; watching from the floor on mats vs. watching from desks; whether TV placement made it possible for children to watch the show and engage in other activities simultaneously.

Child and Teacher Behavior. Between scans, GO made notes on alternative activities of non-attending children (what they were doing and whether they were still within viewing range of TEC), and notes on the behavior of the teacher (whether she was in the room or not, her position in the room, whether she was watching TEC or not, and any audible and relevant comments she made to children during the show). The specificity of these descriptions varied with classroom structure and amount of non-viewing activity. Appendix A1 is a copy of one page of a completed group observation sheet.

Based on information from the group observation sheets, a group attention graph was made for each show which each class watched. The graphs plot the percentage of students not watching the show at each 30-second interval throughout the show. If any scanning at the 30-second bleep was missed, and therefore no attention ratio written on the group sheet, a space was left on the graph corresponding to the missing count. If, due to our late arrival or any delay in turning on the TV, the attention ratios are not recorded at the beginning of the show, the corresponding points on the graph were not plotted. An attempt was made to relate as closely as possible the sequence of plotted points on the graph to the sequence of attention ratios on the data sheets.

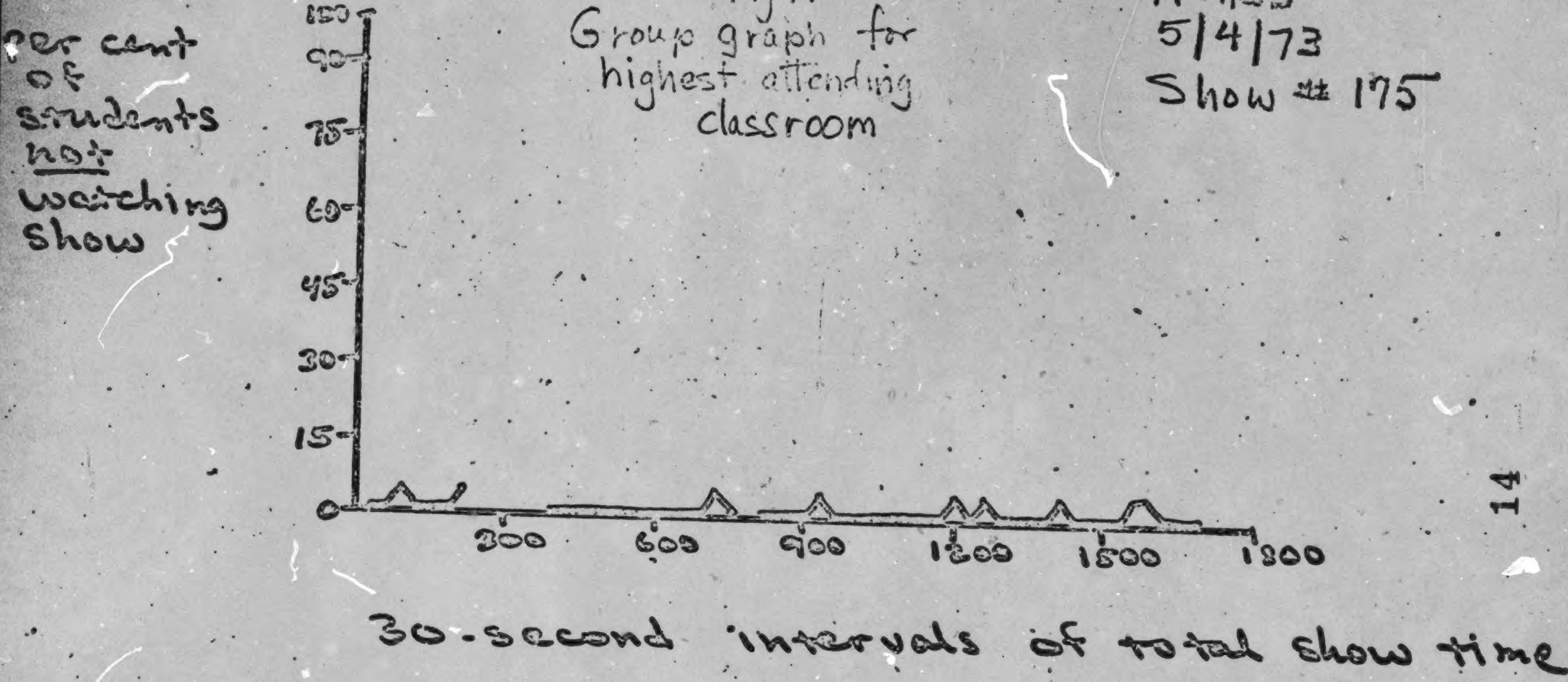
A figure of the average percent of non-attention for each class for each show watched was computed, and this figure noted on each graph. These figures were then averaged for each class and for the set of classes. Although the graphs show inattention, the percents have been subtracted from 100, and these figures for attention are used in all analyses. Attention per class ranged from a high of 99% to a low of 15%. Figures 1 and 2 on the next two pages show the graphs of inattention for these two extremes.

Show Segmentation. While recording group attention ratios with his writing hand, GO marked TEC show segments on the event recorder strip with his other hand. This was done by depressing and releasing the button controlling the recorder line nearest the left margin of the paper strip, deflecting the pen at that point.

During short segments, the group observer had to watch the TV in order to mark the segmentations accurately. During longer segments, which could be anticipated from the observation sheets (except for an occasional discrepancy between sheet and show), GO made his comments on children and teacher. If the beep for group scanning and show segmentation coincided in time, GO had two choices: either delay the scan a few seconds and record it on

Fig. 1
Group graph for
highest attending
classroom

Ames
5/4/73
Show # 175



average per cent
not watching: 1%

Jones
5/29/73
Show # 137

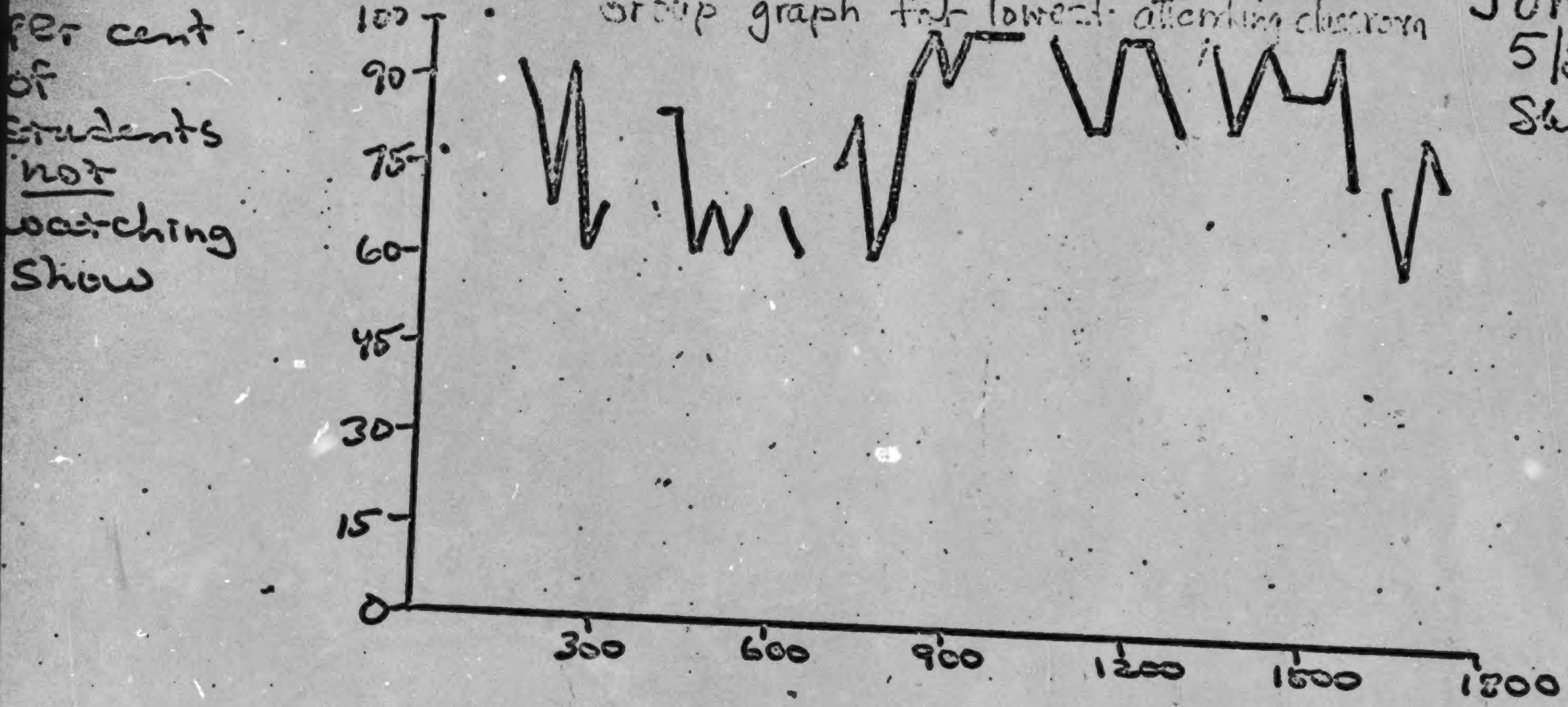


Fig. 2
Group graph for lowest attending classroom

30 - second intervals of total show time

average per cent
not watching: 85%

the row for the next segment; or scan on time, delay the segmentation, note that delay and correct it later on the recorder strip.

Immediately after TEC was over, GO wrote directly on the event recorder tape the show number, teacher and date; the names of individual children whose attention was recorded on the two right-hand lines; and the names of the show segments between the segmentation deflections. Appendix A2 shows a 205-second strip of the recorder tape for one observation.

Individual Observation Procedures

Observers of individual children (IO) each watched one child. With his non-writing hand, IO depressed the event recorder button every time his child's eyes turned away from the TV screen, and only released it when the child looked at the screen again. Each turn away and back, a deflection on the tape, defined a "fluctuation." Percent inattention for individual children ranged from a low of .24% (4/1680 seconds) to a high of 92% (1574/1710 seconds). Without exception, all children we observed watched some of the time. The number of fluctuations made by any one child during the show ranged from 2 to 130.

Individual graphs, comparable to the group graphs described above, were drawn to show attention and fluctuation for each 30-second interval. Graphs of two children watching the same show in the same classroom appear in Figures 3-5 on the next three pages. Top lines are the number of seconds of non-attention in each 30-second interval. The bottom line shows the number of fluctuations in attention in that same interval. At the bottom of each page is the graph of group attention for the class these individual

Fig. 3

Group graph and individual graphs of high and low readers.

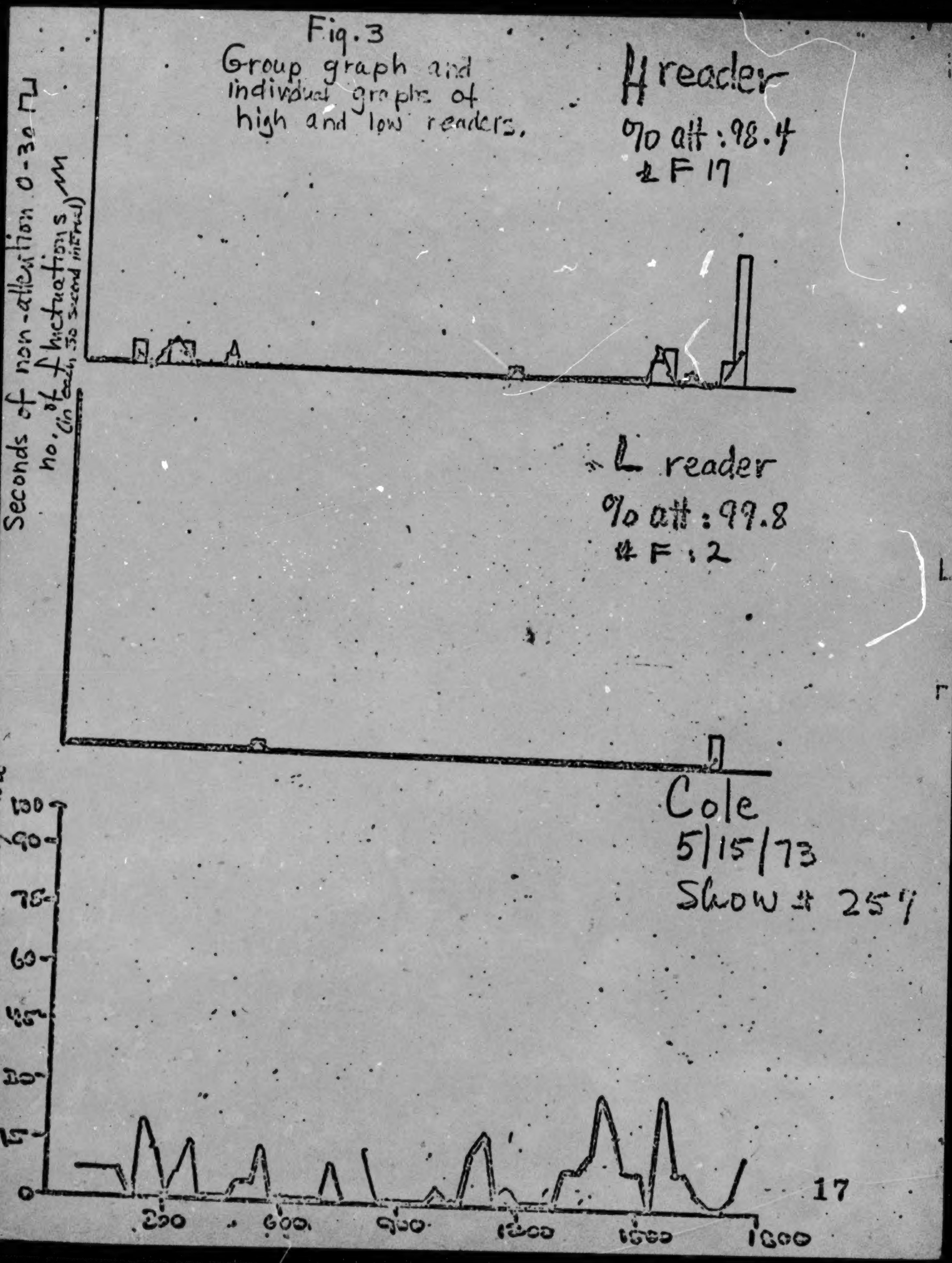
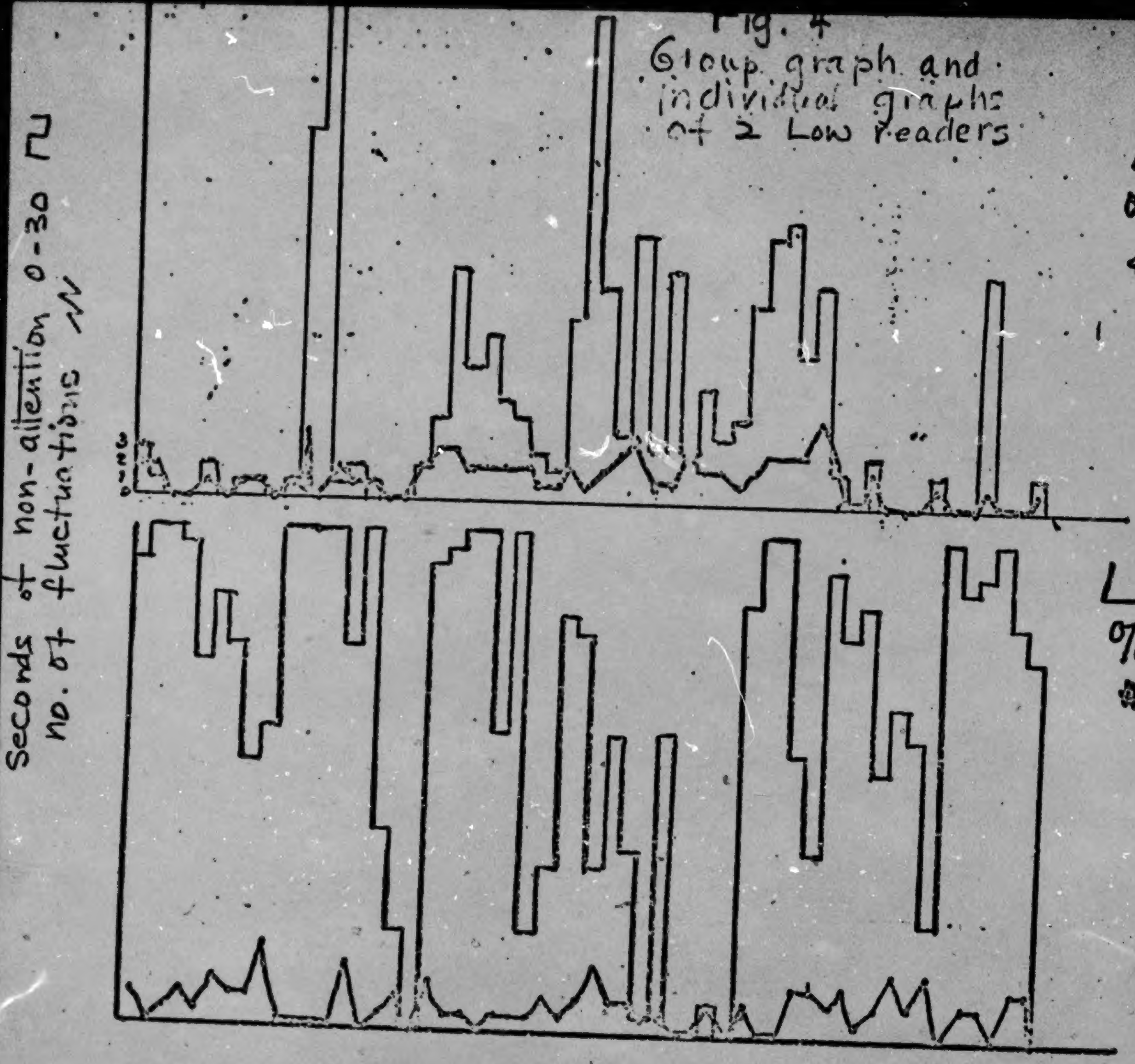


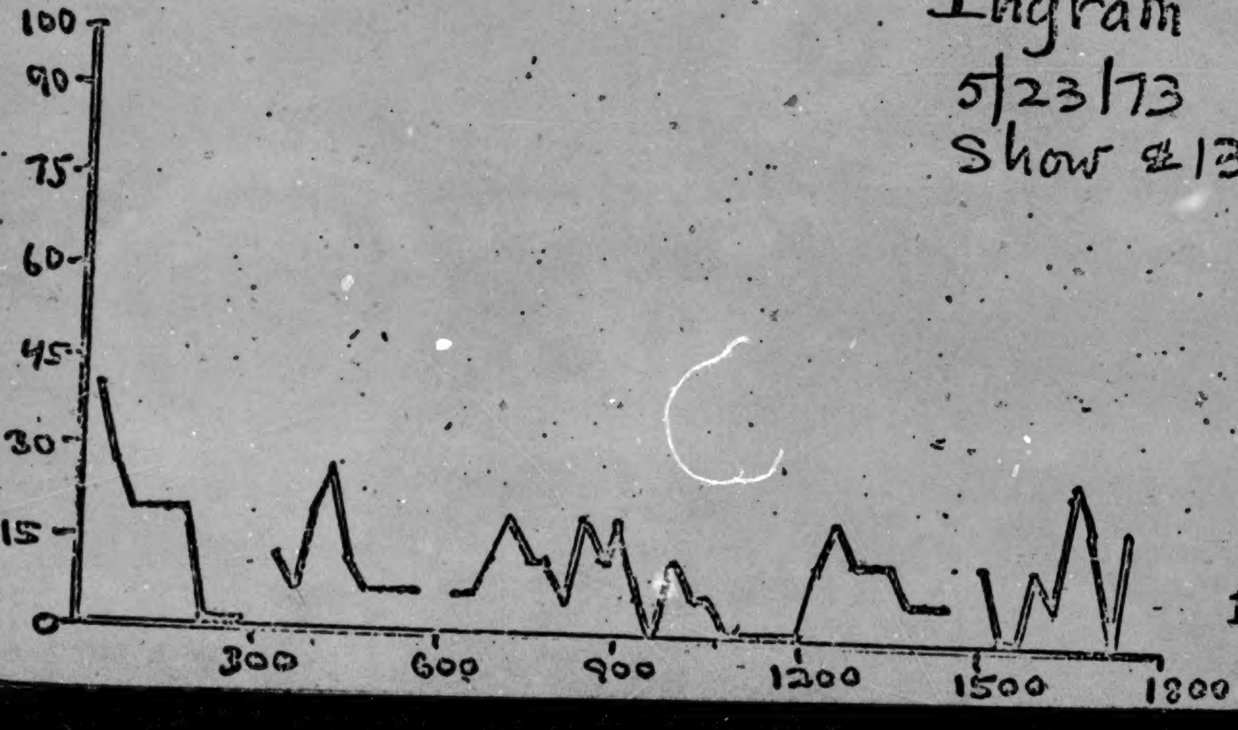
Fig. 4
Group graph and individual graphs of 2 Low readers



L reader
%att: 81.5
F 76

L reader
%att: 34
F: 86

Ingram
5/23/73
Show #133



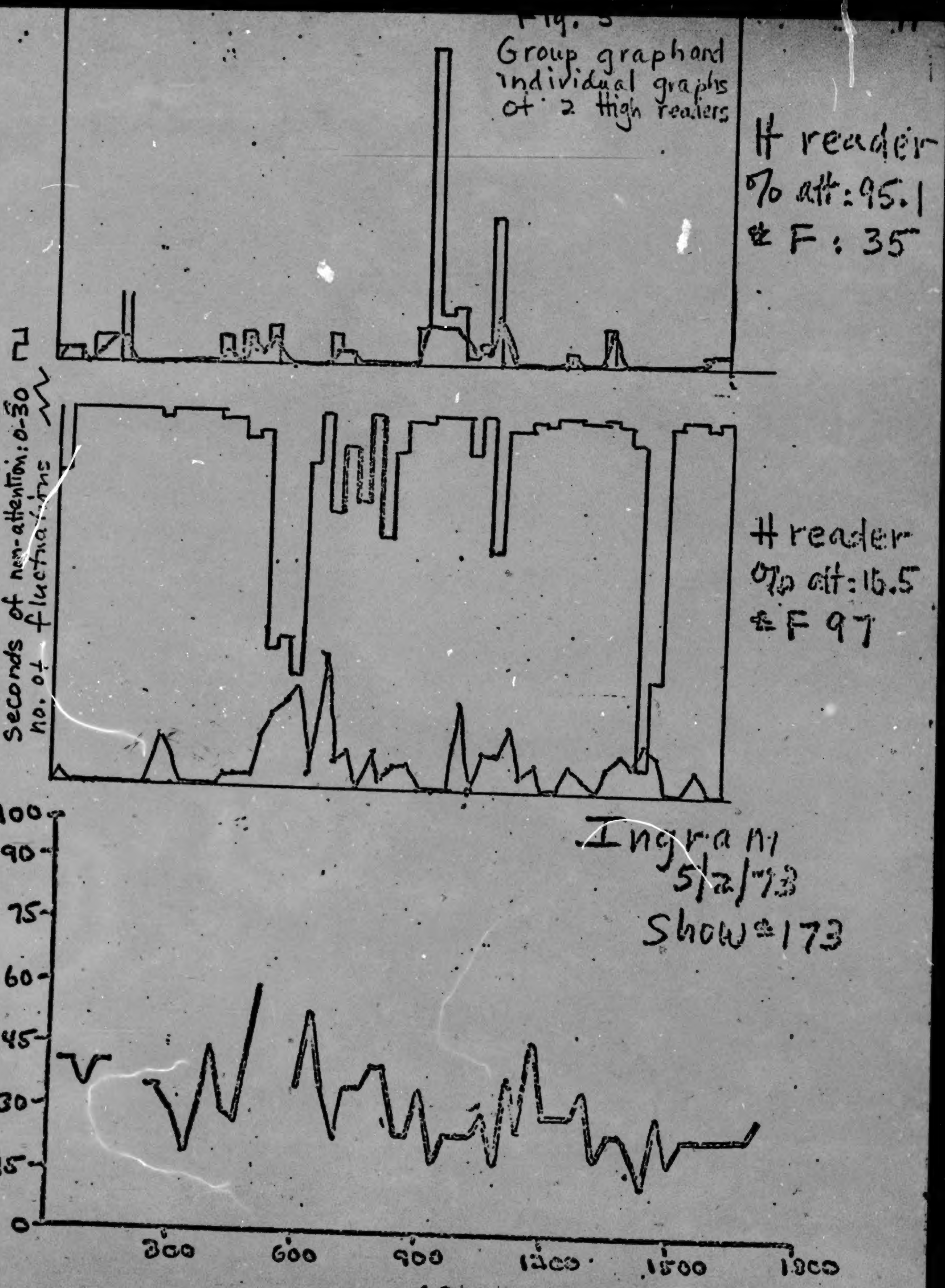


Fig. 5
Group graph and individual graphs of 2 High readers

children were in.

With his writing hand, IO tried to record all show-related verbalizations made by his child. The following coding scheme was used:

R: child reads print that has appeared on screen.

I: child imitates voice-over speech that has not appeared in print. This category includes child singing along with songs presented without printed text.

C: child makes content-related remarks. This category includes affective remarks; negative affect is coded as C-. The remark should not include anything appearing in print.

E: child takes word that has appeared in print and elaborates on it, using it in a word or a phrase, e.g., "Nap. Oh, I'm gonna take a nap." Should be coded RE.

The R category will include reading parts of words, words, phrases, sentences. When child reads part of a word, give a small r. For longer units at least one word long, give a large R, with a subscript for number of words.

Immediate, consecutive repetitions by a child are coded by slashes. Thus, the same word read four times in succession gets R///. But if there is any intervening print at all before the same word is shown again, give a new R. Thus, old words can get new Rs, since the child must be able to recognize the reappearance of the word and distinguish it from the previous word. Thus reading "dinner, diner, dinner, diner" is RRRR.

E.g.:
Silhouette blends: ch op chop = rrR

Electric animated devices to call attention to single words:
soda soda soda = R//

Longer units:
See Sam = R2
See Sam sit = R3
See Sam sit sipping soda = R5

"Silent E" song: If child recites, "If it's there you say 'cute,' if it isn't, say 'cut' " = IRIR

"Street Sign" song: all Rs except for "What can you do?"

Spelling (saying names of letters) is not counted:
s-o-d-a-soda = R

In practice, this set of 4 RICE categories slipped into a simpler set of R (reading), C (all content-related remarks) and S (singing along).

IOs were encouraged to code as much "mouthing" as they could detect. But because it was so hard to hear exactly what a child was saying, we gave up any attempt to differentiate correct from incorrect reading. Because the IO was not wearing a beeper, it was impossible to record the verbalizations in a specific 30-second interval within a longer show segment. They can therefore be analyzed only by show segment, not by time interval. Appendix A3 shows one page of an individual observation sheet.

In the course of developing the IO instrument, we made one comparison of verbalizations of a child watching TEC at home as recorded by an observer seated six feet away, and as transcribed from a tape made with a wireless microphone worn by the child. This comparison is given in Appendix A4. As this comparison makes clear, an advantage of the tape is not only that the child's verbalizations are more fully recorded but also that, because TEC is recorded on the tape along with the child's verbalizations, the temporal relationship between the voice-over on the program and the child's verbalizations can be analyzed. Only with a tape can reading before, or simultaneous with, the voice-over be distinguished from repeating the voice-over (called "shadowing"). Despite the greater accuracy of the taped record, it seemed impractical for any large-scale study and we settled for the best that an observer coding on the spot could do.

In refining this coding scheme and testing the feasibility of simultaneous recording of attention and verbalizations, we worked from video tapes of six children watching TEC. It became obvious that if we really wanted to code verbalizations, one observer could watch and listen to only one child. The number of observers entering each classroom therefore became a compromise between wanting to maximize the information gained on each visit, and wanting to minimize the burden to the teacher and the effect of our obtrusiveness on her and the children. We settled on three observers, GO and two IOs.

Reliability of Observation Instruments

Inter-rater reliability was measured for all 10 pairs of individual observers on their first classroom visit. On that visit, both raters observed the same child for the entire show and their ratings were later analyzed for reliability on both the attention and verbalization measures.

For the attention measure, the reliability estimate was taken from the event recorder tape. The two raters were judged in "agreement" if their records showed identical pen deflections, or in "disagreement" if the deflections were not identical on a second-by-second basis for the entire half hour. The percentage of second-by-second agreement was used as the reliability estimate:

$$\frac{\#\text{ seconds in agreement}}{\text{total }\#\text{ segments}} \times 100$$

One pair experienced equipment failure on the first day and had to be retested. The range of inter-observer agreement for the 10 pairs was 86%-99% with a mean of 93.6%. This was deemed satisfactory reliability. (Difference in observer reaction time in depressing the recorder button probably inevitably produces some non-identical records.)

For the verbalization measure, the two individual coding sheets were compared segment by segment for compatibility of judgment on whether or not specific reading responses (R+/) had occurred. The following formula was used to determine the percentage of agreement:

$$\frac{\#\text{ codings in agreement}}{\#\text{ codings in agreement} + \#\text{ codings in disagreement}} \times 100$$

The range on the first reliability test for the 10 pairs of observers was 25%-100% with a mean of 62.2%. Reliability of the verbalization measure proved to be very sensitive to differences in the seating positions of observers with respect to the child being observed (due to audibility problems, differences in the ability to see lip movements from different perspectives, subject mumbling, etc.) and to differences in amount of verbalization (for 2 Rs vs. 50 Rs, for example). Because of these difficulties, 70% reliability was deemed acceptable. By this criterion, the verbalization data of four pairs of raters were discarded as unreliable, and they were tested again the following week when again they watched the same child and were advised to sit together for purposes of a shared perspective. The final reliability range for reading responses was from 71% to 100% with a mean of 84%.

Reliability for non-reading verbalizations (imitations, comments and elaborations) was even lower because of their infrequent occurrence and because of the difficulty in differentiating among them. Therefore, only reading responses, always defined as R+/, are used in our analyses.

Selection of Classrooms and Children

Selection of Classrooms

With two event recorders, we could visit two classrooms each day, and thus ten classrooms once a week. In finding and selecting classrooms, we looked for diversity in classroom structure that had been a significant variable in our preliminary fall results. We also looked for classrooms that included children below the national norms in reading achievement. In the end, we received permission to visit eight second grades, one first grade, and one third grade in four school districts.*

Because the variable of low vs. high reading ability had also been important in our fall results, we wanted to define reading ability by standardized test scores (which we had not had in the fall) as well as by teacher judgments of relative rank in her class. Some school districts give standardized tests in the fall, and some give them in the spring. Unfortunately, even using percentiles on a national scale, it is not possible to combine the results of tests given at different grade levels or at different times of the year. Therefore, analyses using reading achievement scores include only the six second grades for which fall scores were available. In other analyses, data from all eight second grades or all 10 classrooms are used.

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*Although school districts as well as teachers will remain anonymous in this report, we want to express our appreciation to elementary supervisors, principals, and teachers for not only facilitating our visits, but also making them a genuinely friendly and cooperative experience. We are especially grateful to three teachers who let us come in the fall and again in the spring.

The set of 10 classrooms can be ranked on the basis of one aspect of classroom structure: the degree to which the teacher expected and somehow enforced attention to TEC all the time the show was on ("high" structure) or permitted alternative activities at the discretion of individual children ("low" structure). Following is a list of the teachers in this rank order, divided into two categories of high and low structure. Alphabetical pseudonyms substituted for teacher names are used throughout the report. The average reading percentile for each entire class is also given. Parenthetical numbers (3) and (1) indicate the third and first grades. The six second grade classrooms with fall scores are underlined. More detailed descriptions of each classroom are given in Appendix B.

Table I
Level of Structure and Reading Score in 10 Classrooms

High structure	Average reading %
Ames	32.9
Brown	45.2
Cole (3)	20.0
Dean	47.0
Earl	34.0

Low structure	Average reading %
Frank	29.1
Grant	32.0*
Hall	56.0
Ingram	85.3
Jones (1)	60.6

While seeking and selecting these 10 classrooms, our attention was called to two additional second-grade classrooms where teachers were using TEC in an unusual way. In both classrooms, children were expected to write words from the show as they watched it. We thought it important to try to understand what happened under these conditions, but it was obvious that our regular observation instruments would be completely inappropriate. One observer accepted responsibility for visiting each class once a week, working out special observation procedures, collecting and analyzing children's papers, and reporting what he found out. This report appears after the analysis of data from the other 10 classrooms.

Selection of Children for Individual Observation

We hoped to observe 12 children in each classroom--two per week for six weeks. We understood that CTW was most interested in information on readers who were below grade level and those just on grade level. Therefore, in each second grade we asked for six readers who, at the beginning of the year, scored below grade level (below 2.0, 2.1) and six readers who scored on or about grade level (2.1, 2.2, etc.).* Selection of children in the one first grade was slightly different. The lowest first graders were not taken, on the assumption that they might not even have the barest reading skills, and that TEC was not designed for the non-reader. Thus the first grade class selection consisted of dropping the lowest two children (the class totaled 14) and selecting the remaining 12. Selection of readers for the third grade involved taking six of the lowest readers and six average readers--similar to the selection of second graders.

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*As described in Appendix B, Grant's classroom was joined by two other groups to watch TEC. One group included children labelled educationally mentally retarded (EMR), and we observed several of these children. Subsequent tables always indicate whether the EMR scores are included or not. As it turns out, their effect on the data is negligible.

The criteria for choosing readers were simple enough; the reality, however, was something else. The variation in reading levels between classes was substantial; some classes had few if any children reading below grade level at the beginning of the year, others had almost an entire class reading below grade level. Another factor controlling selection was class size; some classes were so small that all or almost all the children had to be used. Thus the high vs. low distinctions have little meaning between classes, and rather only differentiate within-class differences; i.e., "lows" in one class may be equal to, or better readers than, "highs" in another class. Some of the data analyses will deal with this problem by regrouping all of the children according to percentile reading scores, and, separating actual "highs" from actual "lows," looking for differences between these two groups.

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*According to scores on standardized tests given in the fall of 1972.

One other selection factor should be noted. Some schools do not test children in the fall and thus could not provide us with test scores from the beginning of the year. Selection of these children was based on teacher determinations of high, average and low; we took six of the low and six of the average children (where class size made this possible) from the teacher-made list.

Shows Observed

Viewing was started on April 23 and planned to continue for six weeks, ending June 1. This period coincided with the beginning of the TEC reruns (after #260), and ended just before the week of the annual fund-raising auction on Boston's Channel 2. However, because of the days used in achieving adequate reliability on the coding of reading responses, and because of observations missed for Memorial Day and graduation the last week, we wanted more observations. Channel 2 was not broadcasting TEC the week of June 4, and the following week was too near summer vacation in all four school districts. Therefore, during the week of June 4, instead of watching TEC off the air, we took video tape equipment, and a tape of a show not shown during the previous six weeks, into several classrooms. In one classroom we even had to bring a TV monitor as the one in the room was built into the wall and so was inaccessible to our play-back equipment. Undoubtedly, these special viewing situations had some effect on the teachers' and children's behavior, seemingly increasing the amount of attention to the show.

We ended with 58 classroom observations (5 or 6 per class) of 28 different TEC shows. Appendix C1 gives dates and shows watched by each classroom. We also ended with 102 individual observations, less than 2 per class observation, because of the initial unreliability described above. And this number was further diminished by 3, when 3 individual observation measures were unusable because of event recorder failure. The effective number of observations of individual children was thus 99, and 63 for the six second grades with fall scores.

In assigning observers to classrooms, some kind of rotation would have been desirable. But school schedules and observer schedules made certain assignments more convenient and others impossible. Furthermore, an observer familiar with a classroom--its people, schedule, arrangement of the room (and electric outlets)--could minimize disruptions for everyone. Therefore, we worked from a fixed schedule, with infrequent changes when observers had to trade assignments, or observations missed on Memorial Day and school graduation were made up. Appendix C2 gives the weekly schedule.

Although the primary purpose of this research project was not to compare reactions to different show segments, we were interested in comparing the actual reading response made by children to the potential reading response provided by the show. These findings follow the presentation of results on the 10 classrooms.

Results

Our analyses are described in the following order: attention and reading in 10 classrooms; the effect of classroom structure; the effect of reading ability; the effect of sex of viewer and patterns of attending; interactions between classroom and child variables; the effects of voice-over on reading responses; and a description of the two "writing" classrooms.

Attention and Reading in 10 Classrooms

Table II gives average attention figures for groups, and average attention, fluctuation (F), and reading (always R+/) figures for viewers observed individually, across all 58 observations. It is important to keep in mind that average group attention and average individual attention are entirely separate measures. As described above, group attention was a ratio, number of students viewing divided by total number in classroom, computed by the group observer every thirty seconds. Individual attention was measured by a continuous monitoring on the event recorder of one individual for the entire duration of the show.

Table II
Group Attention, and Individual Attention, Fluctuations and Reading Responses for 10 Classrooms

	Group		Individual			
	n	Att.	n	Att.	F	R+/
Total Sample	58	78.1	99	78.0	52	40.8

Despite these differences, the two measures yield identical pictures of group attention, and two interpretations come to mind. First, the individual children we watched were in this sense "typical" of their classroom group. Second, observations every 30 seconds give a valid and reliable picture of group attention throughout the 30-minute show. (We do not know if fewer observations at longer intervals would have done as well.)

The Effect of Classroom Structure

In our pilot study, we found a positive relationship between attention to TEC and amount of classroom structure. We have now examined this relationship in more detail and find the earlier results confirmed.

Table III summarizes the following information as rank listings:

Column 1: Our judgment of relative structure among the 10 classes observed was based on these criteria: teacher's instructions to the class relative to viewing behavior, her discipline and reprimands during viewing, number of alternative activities available to viewers during TEC, teacher's encouragement of some activities and allowance of others. Our information on these criteria is limited to the times of our observations of classes watching TEC. We did not observe or interview teachers and students at other times of the day. The determination of this rank ordering of classrooms according to structure was done before, and completely separate from, analysis of the observational data. This listing is identical with that on pages 17-18.

Column 2: Average attention of classrooms, computed from group observation data.

Column 3: Average attention of sampled individuals within classrooms (n's given).

Column 4: Average number of reading responses of sampled individuals within classrooms.

Table III
Rank Listings of Classrooms According to
Structure and Viewing Behavior

Groups			Individuals				
Structure	Attention of classes as a group	%	Attention of individuals observed	%	n	Reading responses of individuals	%
Ames	Ames	98.0	Ames	97.4	11	Dean	119.9
Brown	Dean	95.6	Cole	96.5	9	Cole	62.4
Cole	Cole	94.0	Dean	94.2	9	Brown	36.8
Dean	Earl	92.0	Brown	87.5	10	Frank	35.8
Earl	Brown	88.0	Earl	81.9	11	Earl	34.6
Frank	Frank	81.0	Frank	77.6	11	Hall	34.2
Grant	Ingram	72.0	Hall	66.0	9	Grant	31.8
Hall	Hall	72.0	Grant	62.1	11	Ingram	27.6
Ingram	Grant	66.0	Ingram	61.6	10	Jones	19.4
Jones	Jones	31.0	Jones	51.4	8	Ames	14.7

The relative structure of a classroom is closely related to the amount of both attention and verbal participation during TEC. Attention levels are very high for entire classes and individuals within classes for five most structured classrooms;

these levels drop off more rapidly as classrooms decrease in structure and make available more competing activities for the viewer.

Reading responses show a similar pattern, with the surprising exception of Ames: the most structured classroom is first in amount of attention paid by its students but last in average number of reading responses.

Several possible explanations come to mind. First, these viewers may not have had the reading skills necessary to allow them to decode and read aloud words presented on TEC. Comparison of the reading level in Ames' classroom with those of Earl and Frank makes this explanation unlikely. Overt reading responses could be affected by the reading level of the individual observed or by the reading level (and therefore the "climate" of verbal participation) of the entire class. Table IXA (page 31) gives the distribution by percentiles for the individual children observed; Table I above (page 17) gives the average reading score for entire classes. Viewed in both ways, Earl and Frank are very similar in reading level to Ames, yet have a higher average number of reading responses despite lower attention.

Alternatively, it seems more likely that something in Ames' methods of classroom control discourages overt reading responses. Nothing in our observations (see description in Appendix B) suggests how this happens. That it is not an automatic result of what we are calling "high" structure is clearly shown by the data for Brown, Cole and Dean: second, third and fourth highest in structure, their children are third, second and first, respectively, in number of reading responses.

Rank order correlations were computed to test the strength of statistical relationships among classroom structure, attention for classrooms and for sampled individuals, and reading responses.

Table IV
Rank Order Correlations of
Measures of Viewing Behavior

	Group attn.	Indiv. attn.	Aver. reading Resp.	Reading resp. w/out Ames
Structure	.87	.95	.38	.90
Group attn.		.94		
Ind. attn.			.43	.97

As seen in Table IV, structure of the classroom is very highly correlated with attention both as measured for the class as a whole and for individuals as a sample of the class. Furthermore, structure is also closely related to amount of overt reading, if one disregards the case of Ames. Again, with the exception of Ames, viewers who watch the most make more reading responses.

A better test of the relationship between attention and reading responses ("Do children who watch the most read the most?") is found in Table V. Attention level cut-offs were chosen in order to give roughly the same n's across four quartiles of attention.

Table V
Reading Responses Classified by Amount of Attention for Six Second-Grade Classrooms

% Attention	# Reading responses (R+/)	n
96.1 - 100	41.6	14
90.1 - 96.0	58.4	15
75.1 - 90.0	53.4	17
0 - 75.0	13.2	15

In general, reading responses are positively related to attention, except at very high levels of attention (96% and above), where the average number of reading responses decreases, i.e, the relation between attention and reading is curvilinear, not linear. These data would suggest that different viewing styles do exist, but one should be careful in attaching a label like "zombie" to viewers with very high attention levels. In our observations, these viewers as a group still give a substantial number of vocal reading responses. We return to this question in a later section where data on fluctuations are used as indicators of styles of attending.

The rank ordering according to structure can be collapsed, as shown in Table I (page 17), into a high structure vs. low structure dichotomy. The following two tables give the results for all 10 classrooms and the eight second grade classrooms for group attention (Table VI) and individual attention and reading (Table VII).

Table VI
Average Group Attention in High vs. Low Structure Classrooms

		Aver. attn. in 10 class-rooms	Aver. attn. in 8 second grades
High struct.	Ames, Brown, Cole, Dean, Earl	93.5 %	93.4 %
Low struct.	Frank, Grant, Hall, Ingram, Jones	64.4 %	72.8 %

Table VII
Average Individual Attention and Reading Responses of High vs. Low Structure Classrooms

	10 classrooms		8 Second Grades	
	Att.	R+/	Att.	R+/
High struct.	91.5	53.7(- Dean) = 37.1 *	90.3	51.5
Low struct.	63.7	29.8	66.8	32.4

Children in more structured classrooms--that is, those that adopt a more traditional organization (with more teacher-directed viewing and fewer alternative activities) at least during TEC--pay the most attention to the program and also demonstrate more overt reading of the words presented on the screen.

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*The figure for average R+1 is given both including and excluding Dean because (see Table III p.24) her children are unusual in giving twice as many reading responses as any other classroom.

The Effect of Reading Ability

In our pilot study, we found that low readers made more overt reading responses than high readers and suggested this might be because the better readers were reading more subvocally. Use of national percentiles permits a more differentiated look at this relationship.

Distribution of Reading Levels in Classrooms. The following three tables give the distribution of viewers whom we observed individually on two indices of reading ability: teacher assessment in Table VIII and student scores on standardized tests in Tables IXA and IXB. Note that while Table VIII includes all 10 classrooms, Tables IXA and IXB include only the 6 second grades with fall standardized test scores.* Although in Table VIII we use the labels "high" and "low" reading ability for convenience, the teachers were actually asked for average and low readers, as explained above. In Tables IXA and IXB we used the comprehension subtest scores rather than vocabulary scores as one best single measure in the absence of a composite overall score.

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*Table IXB gives the same information as IXA, but it is collapsed into a 2 x 2 form: high vs. low structure and below vs. above the median percentile.

Table VIII
Distribution of Children According to Teacher's Assessment of High and Low Reading Ability

	High	Low
Brown	5	6
Jones	5	3
Cole	5	4
Dean	5	4
Hall	6	5
Ingram	4	6
Frank	5	6
Earl	5	6
Ames	6	5
Grant	6	5
	52	50
	n ≐ 102	

Table IX
Distribution of Reading Comprehension Scores of Six Second-Grade Classrooms on Fall 1972 Reading Test

Table IXA
Comprehension Scores

		1-25%	26-50%	51-75%	76-100%	
High in Structure	Dean	4	0	2	3	9
	Earl	6	2	1	2	11
	Ames	4	5	2	0	11
Low in Structure	Hall	1	3	6	1	11
	Ingram	0	0	1	9	10
	Frank	5	5	0	1	11
		20	15	12	16	63

Table IXB
Comprehension Scores

	1-50%	51-100%
High in Structure	21	10
Low in Structure	14	18

Two characteristics of these distributions should be noted. First, while the division by teacher judgment yields nearly equal numbers, the division by standardized scores does not. Children were selected on the first criterion and so the numbers depart from equality (e.g., 6 and 6) only to the extent that the total is less than 12; e.g., in Jones's class, we ended with a total of only 8 individual observations because of a combination of initial problems of low reliability and final problems in making up lost visits. Since we were selecting children each day from a randomly arranged list, to prevent Os from being aware of reading levels as they watched, there was no way to guarantee complete equality if we did not observe all the 12 selected children. Categorization on test scores, however, gives very unequal distributions from class to class. As mentioned earlier, the relative "lows" in some classes (e.g., Ingram) are absolutely higher than the relative "highs" in other classes (e.g., Frank).

Second, as Table IXB shows, the distribution on absolute test scores is not only unequal from class to class, but unequal between high and low structure classrooms. For unknown reasons, high structure classrooms have more children below the median national reading level. This is also shown in the average percentile given in Table I: 38.0 for the three high structured second grades and 56.8 for the three low structured second grades; or 36.0 for all five high structured classrooms and 52.6 for all five low structure classrooms.

Effect of Relative Reading Ability within Classrooms. When children are grouped according to their relative reading status within their classroom, there is no significant difference in either their average attention or their average number of reading responses. Table X presents these data.

Table X
Attention and Reading Responses for High and Low Readers, 8 and 10 Classrooms

	8 Second-Grade Classes				10 Classrooms			
	n	Attn.	n	R	n	Attn.	n	R
High Readers	41	80.9*	42	47.8	51	79.6*	50	44.8
Low Readers	41	76.2*	43	33.3	48	76.3*	49	35.0

*Without the 1 EMR in the high group and 3 EMRs in the low group these averages are 81.3 and 76.2 respectively for attention in 8 classrooms, and 80.0 and 76.2 for 10 classrooms--virtually identical.

For both the 8 second-grade classrooms and all 10 classrooms, there is a tendency for higher readers to attend more and read more. But the within-group variation is so great that these averages are not significantly different. That variation is exemplified in Figures 4 and 5, pp. 10-11.

Effect of Absolute Reading Levels. The availability of national percentiles makes it possible to examine the relationships between viewing behavior and absolute reading level. These data are given in Tables XIA, XIB and XIC. In Tables XIA and XIB children are divided into groups, above and below the median (XIA) and quartiles (XIB), on their comprehension subtest scores. In Table XIC children are divided into quartiles on their vocabulary test scores.

Table XI
Attention and Reading for Six Second-Grade Classes with Fall Reading Scores

Table XIA
Grouping above and below Median by Comprehension Scores

Nat. %	n:Attn.	Attn.	n:R	R+/
51-100	27	77.5	28	49.9
1-50	34	82.2	35	36.6

Table XIB
Grouping into Quartiles by Comprehension Scores

Nat. %	n:Attn.	Attn.	n:R	R+/
76-100	16	68.6	16	42.6
51-75	11	90.3	12	59.7
26-50	14	86.5	15	37.7
1-25	20	79.1	20	35.8

Table XIC
Grouping into Quartiles by Vocabulary Scores

Nat. %	n:Attn.	Attn.	n:R	R+/
76-100	18	69.8	18	38.8
51-75	13	89.4	14	48.3
26-50	12	85.8	13	49.8
1-25	18	79.7	18	34.9

In Table XIA, the differences in attention are not significant; the differences in reading responses only approach significance at the .10 level on a two-tailed test. The difference in reading responses, tentative as it is, favors the better readers.

In February we also found no difference in attention, but in those five classrooms the lower readers (classified by the grade level of their basal reader in the absence of test scores) made more reading responses (measured by the percent of segments in which at least one reading response occurred).

A more interesting and clear finding is that the very best readers in these classes, those with reading scores in the 76-100% quartile, neither pay the most attention to TEC nor do the most overt reading. Grouped on either their comprehension or vocabulary scores, children with scores falling between 51% and 75% have the highest attention rate and highest average number of reading responses. Further, children in the lowest quartile of the second grade (TEC's explicit target audience) pay more attention to the program than children in the highest quartile. The reading response of children in the second quartile (26-50%) may be less or more than the reading response for viewers in the highest quartile, depending upon which measure, comprehension or vocabulary, is chosen. This is encouraging documentation that TEC is effectively reaching its intended audience. We will discuss later the extent to which these results may be influenced by the presence in high structure classrooms of 3/5 of the low readers and only 1/3 of the high readers (as previously shown in Table IX).

It is difficult to draw a firm conclusion about the behavior of viewers in the top quartile. In our pilot study, we found the same curvilinear shape for verbal response, with the best readers (indicated by level of their basal readers) making less overt reading responses while maintaining high attention. We hypothesized that these able readers were reading more subvocally. Here again, we find the best readers characterized by fewer overt reading responses, but now also paying less attention. One would not expect children who watch less of the show to read as many words aloud as those who watch more; so, taking these figures at face value in the absence of any measure of subvocalized reading, the best readers may actually be reading less aloud or silently, and this may be due to decreased attention to the show. But then the question arises, Why do these children pay less attention? Here too the answer is unclear because 2/3 of these highest quartile readers are in low structure classrooms. Therefore, one cannot conclude that, regardless of viewing circumstance, the show has less "appeal."

Effect of Relative Ability vs. Absolute Reading Levels. Surprising as it may seem, in our limited data a child's relative standing in his class affects his viewing behavior across all absolute reading levels. This effect is more easily explained in Tables XIIA and XIIB. For six second grade classrooms, the percent attention and average number of fluctuations is shown for children in each reading score quartile who happen to be relatively "high" or "low" readers in their classrooms.

Table XII
Attention and Fluctuations of Children in Six Second Grades by Absolute Reading Level and Relative Standing in Class

Table XIIA
Percent Attention

National Scores (Comprehension)

		1-25%	26-50%	51-75%	76-100%
Standing within Class	high	n = 0	89.5 n = 10	90.9 n = 9	73.2 n = 11
	low	79.1 n = 20	79.0 n = 4	87.3 n = 2	49.4 n = 5

Table XIIB
Number of Fluctuations

high		51.2	30.6	44.4
low	50.6	58.6	57.5	64.6

Because our sample was not designed for matching numbers of children in each of these cells, firm conclusions cannot be drawn. But in these limited data, without exception, children of the same tested ability show less attention and more fluctuations (distractions) when they are among the lowest readers in their classrooms than when they are in the middle or higher groups. This phenomenon deserves further research.

The Effects of Sex and Patterns of Attention

Before considering the important question of interaction between reading ability and classroom structure, we report analyses of the effects of two other individual characteristics: sex and patterns of attention.

Sex. Table XIII gives data for viewers in all ten classrooms. First, attention and reading responses are given for boys and girls in all ten classrooms; then the distribution of boys and girls in high vs. low structure classrooms is shown; finally, the distribution of boys and girls above and below median in reading level is given for the six second-grade classrooms.

Table XIII
Sex Differences in Attention and Reading, Distribution in High vs. Low Structure Classrooms, and Absolute Reading Levels

	Viewing behavior for 10 classrooms			Distribution in 10 classrooms		Distribution by reading level in 6 classrooms		
	n	Attn.	R+/	High str.	Low str.	n	0-50%	51-100%
Boys	57	78.3%	36.9	27	32	34	23	11
Girls	42	77.7%	45.9	23	19	28	12	16

There are no differences in attention to TEC between boys and girls. The girls make more overt reading responses but because of large within-group variation, this difference only approaches significance at the .10 level. In view of the distribution of boys and girls by classroom and reading level, it is perhaps surprising that this difference is not greater: we observed relatively more boys in low structure classrooms, and the second-grade boys were much poorer readers (2/3 of the boys below the median vs. less than half of the girls). TEC is evidently doing a good job of appealing equally to both boys and girls and eliciting reading responses from them.

Patterns of Attention. One intriguing question is what constitutes optimal attention. In our pilot study we found that attention as measured by fixation to the screen, and attention as measured by number of reading responses, were sometimes but not always correlated. One explanation discussed above is that better readers may read subvocally; another is that certain children--"zombie" viewers--may show very high and constant fixation to the screen but read little. With the event recorder it was possible to determine how many times a child's attention fluctuated to and from the screen. Thus we could examine whether constant, undivided "zombie" attention was more highly correlated with reading responses than the "active participation" indicated by a low level of fluctuation.

Hypothesis: Children with a low level of fluctuation in attention are actively viewing, and will show a higher number of reading responses than children either with no fluctuations (zombie viewers and complete non-attenders) or with a large number of fluctuations (those easily distracted).

Each 30-second interval for an individual child was classified as having either no fluctuations while not attending (i.e. not watching show at all), no fluctuations while attending, one or two fluctuations, or three or more. Since reading responses are not possible in the first category (no fluctuations because of complete non-attention) this category does not appear in the analyses. Since reading responses were recorded on the individual observation sheets by show segments, not by time interval, it was necessary to compare individual graphs with charts mapping show segments onto a 30-second time line to achieve an overall characterixation of a child's viewing style for each segment. Only if all the 30-second intervals of a segment elicited the same pattern of fluctuations--none, 1 - 2, 3 or more--were these intervals classified and included in the data. These characterizations, though admittedly arbitrary, do allow a considerable number of intervals and reading responses to fall into each category and allow us to try looking more closely at the correlates of different patterns of attention.

Data collected for a small sample of nine children, selected to represent a wide range of attention levels, fluctuation rates, and amount of reading, are given in Table XIV. Because shows differ slightly in the number of 30-second intervals, and the rate of reading responses differs greatly from child to child and show to show, data are expressed in percentages. The first column of data gives the child's average percent attention. The next set of columns gives the distribution of 30-second intervals by fluctuation level. The middle set of columns shows the percent of intervals in each fluctuation category during which the child made at least one reading response. The final set of three columns shows the distribution of the child's reading responses among the fluctuation categories.

For six of the nine children the largest percentage of total verbalizations came in F 12 intervals; for the other three (Wright, Greg and Susan) it was in FO. Of the six, all but Danny read more in F 12 than would be expected from their percentage of F 12 intervals. Finally, differences in means of percent of reading responses (last columns) for the nine children are significant at the p .05 level (on a one-tailed test, since we predicted a direction).

Table XIV
Percent of Reading Responses in Three Fluctuation Categories for Nine Children

				% 30-second intervals				% 30-second intervals with reading resp.			% of total reading resp.		
Shows	Teacher	Pupil	Aver. % attn.	FO with non attn	FO with attn.	F 1-2	F ± 3	FO with attn.	F 1-2	F ± 3	FO	F 1-2	F ± 3
Show 133	Hall	Steven	21.8	39.2	2.0	41.2	17.6	100.0	9.6	22.2	20	60	20
	Ingram	Danny	71.5	1.8	26.8	53.6	17.9	40	63.3	50	31.7	48.8	19.5
Show 176	Brown	Wright	89.9	0	57.1	37.5	5.4	34.4	57.1	66.7	66.1	28.8	5.1
Show 177	Cole	Greg	95.7	0	60.7	32.1	7.1	41.2	50	25	65.2	33.7	1.1
		Susan	97.9	0	76.8	21.4	1.8	32.6	50	0	66.7	33.3	0
Show 259	Frank	John	77	0	20	40	40	0	18.2	18.2	0	67	33
		William	96.3	0	67.3	25.5	7.3	48.6	78.6	50	46.1	48	5.9
	Earl	Karen	49.7	26.4	17.0	52.8	3.8	44.4	32.1	0	25	75	0
		Diane	58.5	7.5	26.5	49	17	7.1	26.9	33.3	2.9	88.6	8.6
Means				8.3	39.4	39.2	13.1	38.7	42.9	29.5	36	53.7	10.4
Ranges at t .05											±16.4	±12.5	

While these procedures are crude and the results only tentative and for a very small sample, they do indicate that fluctuations my be useful as a measure of more active attention. This research was not designed for such analyses, but use of the event recorder does make it possible.

Interactions between Classroom Structure and Reading Ability

In February we reported that an important interaction between classroom structure and reading level influenced children's viewing behavior. We found then that in more structured classrooms, patterns of attention were similar and very high for high and low readers, while in less structured classrooms attention for poorer readers decreased more than for better readers. Now, with 10 classrooms instead of 5, we still find a strong interaction but of a slightly different nature. The data will be reported first for relative reading ability and then for absolute reading percentiles.

Interaction with Relative Reading Ability. Table XV gives average attention figures for high and low readers within each class, from highest degree of structure on the left to lowest degree of structure on the right.

Table XV
Attention of High and Low Readers in Classrooms Ranked by Degree of Structure

	Ames	Brown	Cole	Dean	Earl	Frank	Grant	Hall	Ingram	Jones
Highs	97.3	89.8	95.6	94.0	92.2	83.9	50.7	68.4	71.7	53.2
n	6	5	5	5	5	5	6	5	4	5
Lows	97.6	85.2	97.5	94.4	73.4	72.3	75.8	63.0	54.8	48.3
n	5	5	4	4	6	6	5	4	6	3
Difference + favoring high - favoring low	-.3	+4.6	-1.9	-.4	+18.8	+11.6	-25.1	+5.4	+16.9	+4.9

If our February findings were to be replicated, differences in attention between high and low readers should be small in the five high structure classrooms on the left, and increase in favor of higher readers (+ in the bottom row) in the five less structured classrooms on the right. Earl and Grant are two significant exceptions to this pattern. After the fact, both can be "explained away."

In Earl's class, where there was one atypical day in which more children than usual continued a writing assignment, both children observed did choose to write and their attention levels dropped to 58.5% and 49.7%, the lowest of all the observations in this classroom. By chance (because the lists we picked children from were randomized to prevent observers from knowing the reading levels of the children they were watching), both these children were low readers in the class.

In the case of Grant, three of the five low readers and one of the six high readers were EMR students from a neighboring classroom. Taking the four EMR students out of the computation leaves a similar margin between high and low readers, but leaves only two viewers in the low category.

A more general look at the differentials in attention between high and low readers as structure decreases can be gotton by combining classrooms into a high vs. low structure dichotomy, for eight second-grade classes and the full ten. These data are given in Tables XVI A, XVI B and XVI C for attention, reading responses and fluctuations respectively.

Table XVI
Viewing Behavior of High and Low Readers,
In High vs. Low Structure Classrooms

A. Attention

	8 Second grades		10 Classes	
	High str.	Low str.	High str.	Low str.
High readers	93.5	67.6	93.0	64.7
n	21	20	26	26
Low readers	86.6	66.4	88.4	64.1
n	20	21	24	24

B. Reading responses

	8 Second grades		10 Classes	
	High str.	Low str.	High str.	Low str.
High readers	54.3	41.4	54.5	35.4
n	20	21	24	24
Low readers	42.4	24.6	46.6	26.9
n	21	22	25	24

C. Fluctuations

	High str.	Low str.
High readers	33.1	56.6
n	21	20
Low readers	40.8	69.7
n	20	21

In all three graphs, for attention, reading responses and fluctuations, a single pattern is evident: the order of cells is $\begin{array}{|c|c|}\hline 1 & 3 \\ \hline 2 & 4 \\ \hline\end{array}$ with the diagonal of lower-left to upper-right most ? interesting. While high readers in high structure classrooms (cell 1) have highest attention, most reading responses and least fluctuations, and low readers in low structure classrooms (cell 4) have lowest attention, fewest reading responses and most fluctuations, low readers in high structure classrooms (cell 2) do better on all three indices than high readers in low structure classrooms (cell 3).

It seems as if individual achievement levels and the structure of the environment in eliciting attention are additive, each contributing to a child's behavior at any moment. But, at least in these data, a structured environment can more than make up for lower achievement levels in the power of its influence.

Interaction with Absolute Reading Percentiles. The results change slightly in a comparable analysis using national percentiles, presumably because n's within classrooms do not distribute evenly across standardized quartiles. In the extreme case, all the children in Ingram's class (the least structured of these six second grades) are reading above the median for second grade. Table

XVII A gives this data for the six second grades and Table XVII B gives the same data collapsed into a high structure vs. low structure dichotomy.

Table XVII
Attention Levels for Children Reading above and below National Median by Classroom Structure

A.

	Ames	Dean	Earl	Frank	Hall	Ingram
High (51 - 100 %)	98.0 %	94.0 %	95.9 %	85.7 %	72.6 %	61.5 %
n	2	5	3	1	6	10
Low (0 - 50 %)	97.4 %	94.4 %	76.7 %	76.7 %	52.9 %	-
n	9	4	8	10	3	0

B.

	High str.	Low str.
High (51 - 100 %)	95.4	66.9
n	10	17
Low (1 - 50%)	88.9	71.2
n	21	13

As was the case when children were grouped by reading levels within class, the low readers in a high structured classroom are second only to the better reading children in those same classrooms, but the order of cells 3 and 4 are reversed, probably because of the Ingram data.

We can now specify the difference between the interaction effect reported in February and here. In February, we spoke of high structure narrowing the reading level differences in viewing behavior. In the present data, there is no clear evidence of a narrowed gap. Instead, high structure seems to affect all children, increasing both their attentiveness and responsiveness to TEC, to such an extent that--as described above--it more than compensates for lower ability levels in determining behavior.

Voice-over Effect on Reading Responses

In our pilot study we suggested that the ratio of actual to potential reading responses might be valuable for comparing responses to segments in which the amount of print on the screen varied greatly. In starting actually to code shows for the number of print units they provided for reading, it was obvious that a distinction could be made between print accompanied by a simultaneous voice-over vs. print with delayed voice-over or none at all. It seemed likely that having print read just prior to, or immediately upon, visual presentation would be a signal to the child that it was not necessary to read it himself (at least aloud), and that there wasn't time to do it anyway; print without voice-over, by contrast, would leave both the task and the time for reading more clearly with the child.

To test the hypothesis that print presented with a simultaneous voice-over is read less often than print without that voice-over, five shows for which we had both videotapes and individual observations were coded for potential reading responses, using the same code as for actual reading responses, but divided into voice-over and no voice-over. Then the segments in these two categories were compared for their potentiality in eliciting overt reading responses from all the children observed individually during these shows.

Each potential reading opportunity (part of a word or word) was classified as voiced-over or not voiced-over. The criteria for voiced-over print were: audio equivalent of the print appearing on the screen just prior to, simultaneous with, or immediately following the appearance of the print; "just prior to" and "immediately following" were defined as less than five seconds. However, in all but a few cases, voice-over either came simultaneously with the print or not at all. In the majority of segments, all print was either voiced-over or not voiced-over, and the segments were so classified. Because our observation data on individual children did not record which potential reading responses were read within a segment, the few segments which included both voice-over and no voice-over print (e.g. City Sign Song) were classified as "mixed", and the responses to those segments were labelled "unclassified" and not further analysed. Informal reliability was established by having one show scored by two observers. The other five shows were scored by one observer.

Table XVIII shows the categorization of segments into voice-over and no voice-over, and the number of potential reading responses in each category, for one show, #256. Table XIX, immediately following, gives the analysis of potential/actual reading responses for 19 children watching six shows.

Table XVIII
Potential Reading Responses, Categorized as Voice-Over and No Voice-Over, in TEC Show 256

Segment	Voice-Over	No Voice-Over	Mixed
Cold opening radio 1:13	1		
Opening and ID :47	9		
Message Mon-run :37		1	
Song: Randy 2:27	1		
Frog Prince :50	49		
Pronunc'n / rock :27	20		
Rocket Rebus :57	7		
Jolly Roger 5:11	35	6	x
Song: Trying to Live in a Trumpet 1:02	9		
Rain / train	2		
Clothesline blend 3:56		12	
Abstract bridge			
Pass the apple :50	4		
Marching band :12			
Restaurant scene :28	5	2	x
To the subway 1:19	14		
City Cat Baby 1:00			
Hircus of the Cirucs 2:19		5	
Burn :20	3		
This won't hurt a Burt :44	6		
Song: My Name Is Kathy	73		
Teaser :15		4	
Logo and theme			
Total potential responses	238	30	
Total segments	13	4	2

Table XIX
Ratio of Actual/Potential Reading Responses for Voice-Over vs. Non-Voice-Over in Six TEC Shows

	Voice-Over			No-Voice-Over			
	Potent.	Actual	Act/Pot.	Potent.	Actual	Act/Pot.	Unclass.
Show 134	138		14.7 %*	76		28.5 %*	
Teacher: Frank							
Carol		17	12.3		6	7.9	
Vaughn		2	1.5		2	2.6	
Teacher: Earl							18
Daniel		44	31.9		39	51.3	
Debbie		18	13.0		39	51.3	
Show 138	105		12.4	20		31.7 %	
Teacher: Hall							
Pat		28	26.7		17	85.0	
Teacher: Ingram							1
Donna		9	8.6		2	10.0	
Edward		2	1.9		0	00.0	4
Show 256	238		9.7 %	30		50.0 %	
Teacher: Brown							
Jimmy		23	9.7		15	50.0	8
Show 161	224		11.8 %	81		15.1 %	
Teacher: Brown							
Lisa		3	1.3		4	4.9	
Thomas		3	1.3		7	8.6	
Teacher: Jones							
Gloria		55	24.6*		12	14.8	
	*or 9 responses, 4.0 %, without talking dog segment						
Teacher: Hall							
John		37	16.5		21	25.9	
Karen		8	3.6		5	6.2	
Show 176	218		19.0 %	41		14.7 %	
Teacher: Brown							
Dennis		38	17.4*		9	22.0	18
Wright		45	20.6**		3	7.3	8
	*or 25 responses, 7.8 % without silhouette blend **or 17 responses, 11.5 %, without silhouette blend						
Show 178	192	.	20 %	69		44.2 %	
Teacher: Hall							
Mark		34	17.7		20	29.0	17
Rene		47	24.5		19	27.5	
Teacher: Ingram							
Jennifer		57	29.7		51	73.9	
Mark		16	8.3		32	46.4	14
N 19							
Means and range at p .025 on 1-tailed test			14.3 ± 4.8			27.6 ± 12.0	
S.D.			10.1			25.2	

---

*% in same row as show no. is mean of actual/potential responses for all children observed watching that show.

In Table XIX, two patterns stand out. First, reading opportunities are far more apt to be provided on TEC with a voice-over accompaniment, at least on these six shows. We have no reason to suspect they are a biased sample. Second, reading opportunities which are not voiced over are at least twice as likely to be read aloud as reading opportunities which are voiced over. The tendency for greater reading of print not voiced over holds for 15 of the 19 children. When looking at each show separately, individual segments may skew the data markedly: e.g. in Show 176, half of the actual voiced-over reading responses occurred in the silhouette blend segment (which is always effective and "well-read"). When the data are combined for all 19 children, the means for potential/actual ratio are 14.3 for voice-over and 27.6 for no-voice-over, significantly different at the p .025 level.

If eliciting overt reading responses is considered a worthy TEC goal--and we believe it is--the implications of these two patterns are clear: present a higher proportion of segments with delayed voice-over. Although the ratio of voiced-over to voiced-over potential reading responses for these six shows varies from 2:1 (Show 134) to almost 8:1 (Show 256), these ratios appear to have little effect on the power of not-voicing-over to elicit reading. The implication for program planning is that the relative amount of not voiced-over print can be increased at least to the 2:1 ratio of Show 134 and still retain ats effectiveness in eliciting more overt reading.

Two Writing Classrooms *

This report is based on observations and analysis of two second-grade classrooms, whose teachers we will call White and Walsh, that were somewhat unique in their use of TEC. In both situations the normal viewing procedures were modified: each child was given paper at the onset of each show and directed to copy from the television each printed word or syllable that appeared. This system was first employed by one teacher and then adopted by another teacher in the same school. Though the methodologies were similar, the results the two teachers achieved were quite different. This disparity seems to be due to the interaction of teacher style with viewing procedures, rather than to differences between the two student groups.

White's class was comprised of twelve students, six boys and six girls. Usually, White would turn the class over to her assistant (student teacher) while TEC was being watched, although both would from time to time address the children. The viewing typically began by the student teacher standing in front of the room just prior to logo and telling the children to be quiet and get ready to get all the words. After opening logo, the children would be talking or singing in response to TEC, and the assistant would simply snap her fingers and insist the children begin writing. The noise level was immediately reduced and the trend was set for the next half hour. There was generally very little prolonged verbalization from the children. At times, either White or the

---

*This research carried out and reported by Lubin.

assistant would ask something of the children, allow a moment for response, and then cut off the child by instructing him/her not to talk and instead attend to writing and the show. The children seemed uninterested in the task. Often it seemed that most of the children did not understand the humor in TEC since they were so unresponsive. However, as their enjoyment of the humor and jokes increased, their word-writing decreased, often bringing White (or assistant) to her feet, snapping her fingers (or some other punitive measure) to regain control. For White and assistant, the work on the papers took strong precedence over spontaneous and contextual enjoyment of TEC.

The Walsh class was comprised of eighteen students, six girls and twelve boys. The classroom displayed a variety of projects and papers done by students hanging from everywhere. For viewing TEC, they used a very old 12" television that had to be warmed up long in advance so the show might be visible. At the outset of each show, Walsh would get everyone properly situated so they could see the show. As the show began, almost everyone would be singing the opening logo. As the program progressed, there was a good deal of verbalization and noise. A clear competitive spirit in filling paper booklets with words existed. Some children simply wrote the same word in repetition until they could pick up another (see chart). Often the show would spark some children into telling stories of class field trips, projects, etc. The writing exercise did seem to detract from the child's appreciation of the show as entertainment. Proximity to the television seemed to have some relationship to the child's interest in word gathering. However, given the small size of the picture and the distance to the back of the room, the disparity was understandable. Clearly, the writing method promoted a high level of attention to the show. Only one child on one day was observed doing an entirely different task during all the visits to the Walsh group. Walsh often walked around the room giving an affectionate hug to a child who showed his paper to her. As a result, the children were constantly calling for her to "come and see" the number of words they had amassed. The children who had more difficulty with the task were rarely prodded in a punitive manner. Rather Walsh would sit beside a child and help him for a few minutes, constantly reinforcing his improvements. The children's reliance on her praise as stimulus for their word-writing was observed in the obvious decrease in writing activity at those times when she stepped out of the room.

As observer in both classrooms, I would unusally sit off to the side of the class and make notations about each child's viewing style at the particular moment observed. It was quite clear that the children were aware of my presence, but after an initial period of acquaintance, I believe any effect on them was minimal. I visited each class once per week, arriving at the beginning of each show, and leaving soon after the end. The data reported here come from four weekly visits to each classroom.

A framework for describing elements of child characteristics and viewing style was developed:

1) Reading continuum--ranks child's reading ability from one (excellent) through three (averave) to five (poor), based on standar-

dized test scores.

2) Average word count--indicates average number of words written per show while watching TEC based on four viewings. Those who wrote few words with many repetitions (i.e., had a lower type-token ratio) are marked by an asterisk.

3) High verbal--a child who is often responding to TEC or talking about something related to TEC (because the technique created such high attention levels, verbalization almost always related to TEC in some way).

4) Low or non-verbal--a style of viewing TEC that contrasts with the more active verbal child characterized by #3; a child who watches TEC with much less visible excitement, and is seldom heard to respond vocally to TEC.

5) Attender--a child who has a generally constant awareness of what is being shown on TEC; he is attuned to the show content, rather than just to a series of words to be written down.

6) Low or non-attender--a child who is unaware of or not attuned to TEC; a child who is doing some other task or for some other reason gave little or no attention to TEC; he would be unaware of content and unable to respond to the show.

7) Word hunters--the most difficult category to define, a type of viewing style which combines elements of both attention and low non-attention. The word hunters seem to have the unique ability to instantaneously switch on or off their attention to TEC. They can be observed talking with others or not fully attending to the show, but the moment a new word is flashed they literally grab it, write it down, then "switch off" the segment until another

word is flashed on. They were the ultimate in selective attention.

Tables XXA and XXB present the analysis of viewing behavior in the two classrooms, White and Walsh respectively, using these descriptive categories. Samples of the children's papers are given in Appendix E.

Table XXA
Viewing Behavior of 12 Children in One Writing Classroom

Child	Sex	Reading Continuum	Average word count	High verbal	Low or non-verb.	High attent.	Low or non-attent.	Word hunter
1	m	5	9.0	x		x		
2	m	3	9.5	x		x		
3	m	1	29.5	x		x		
4	m	3	21.5		x	x		
5	m	2	22.5		x	x		
6	m	2	21.0		x	x		
7	f	2	17.0		x	x		x
8	f	5	14.0		x	x		
9	f	1	29.0		x	x		x
10	f	4	13.5		x	x		
11	f	1	50.0	x		x		x
12	f	1	20.5		x	x		
Total 12			21.5	4	8	12	0	3

To summarize Table XXA: In White's class

1) Most children are non-verbal.

2) Most of the time, all children attended to TEC.

3) 100% of those classified as word hunters (those who respond most to the teacher's desire to take down words) are females (their attention patterns would be a constant fluctuation from very high to very low).

4) Words-per-show-written closely reflects reading ability grouping.

Table XXB
Viewing Behavior of 18 Children in a Second Writing Classroom

Child	Sex	Reading continuum	Average word count	High verbal	Low or non-verb.	High attn.	Low or non-attn.	Word hunter
1	f	4	33		x	x		
2	f	3	92		x	x		x
3	f	1	94.5		x	x		
4	f	2	107		x	x		x
5	f	5	88.5*		x		x	
6	f	-	96.5		x	x		x
7	m	4	122	x		x		x
8	m	4	34.5	x		x		
9	m	5	73	x		x		
10	m	1	68.5		x	x		
11	m	5	59.5*		x	x		
12	m	4	53	x		x		
13	m	2	101		x	x		x
14	m	4	67.5	x		x		
15	m	3	32*	x			x	
16	m	1	27		x		x	
17	m	5	107	x		x		x
18	m	1	76*	x			x	
18			74.0	8	10	14	4	6

*These children were word repeaters on their papers.

There are several interesting comparisons between the two classes.

1) White's group had 33 % verbalizers, Walsh's 44 %.
2) White had 100 % attenders, Walsh 77 %.
3) Yet the average word count in Walsh's class is more than triple that of White; 9 of the 12 children in White's class score lower than the lowest in Walsh's group; 14 out of 18 in Walsh's group are higher than White's highest.
4) In both groups, verbalization was correlated with sex, with males more outspoken.
5) Whereas in White's group all the word-hunters were girls, in Walsh's group they were evenly divided by sex.
6) in the Walsh group some children wrote the same word repeatedly in order to fill papers (a sign of success), whereas this was not done in White's class.
7) Word counts were much less helpful in preducting reading score in Walsh's class than in White's.

These are significant differences. Two groups of children with similar backgrounds in the same grade in the same school had teachers who embodied a highly structured approach to elementary education and employed a similar TEC-viewing procedure. Yet the two situations yielded very different results. To make sense of these results, we must investigate and analyze the interaction of teacher style with program structure. To the observer, it seemed we were viewing contrasting points on still another continuum: in behavioral terms a range from positive reinforcement to aversive stimulation or, in more suggestive words, from loving to threatening.

In White's class, children received the teacher's attention as a result of non-viewing or non-writing, generally in the form of punitive words. Rarely did the teacher reinforce the work of her students by a pat on the back or a show of affection. Walsh, by contrast, rarely found it necessary to deal with a child in a harsh tone. In general, she had a loving relationship with her students and they with her. Her attention was a very sought-after reward.

These results suggest that it is not enough to view classroom structure without also considering interaction with teacher personality and interpersonal style.

In Retrospect and Prospect

The results of this research are summarized in the first two pages, and that summary will not be repeated here. Instead, this report will end with a few more general comments on what we did and did not accomplish. The purposes of this research were both methodological and substantive, and some of both were achieved.

Reliable and valid procedures for group and individual observation of attention were established. It is possible that on the macro level of group attention, scanning at less that 30-second intervals would be just as accurate. Where focus is on the micro level of analysis of individual behavior--e.g. a more refined behavioral description of the "zombie" pattern of attention--verbalizations could be coded for the same 30-second intervals as attention if IOs also wore beepers. But the problems of valid and reliable coding of verbalizations will remain.

Substantively, our research hoped to yield suggestions for both TEC producers and TEC consumers (the teachers). Our suggestion to the producers is more definite: increase the relative amount of delayed voice-over print. The advice to teachers supported by our findings is hardly new: if you want children to attend and read actively and with enjoyment, expect then to watch, reduce competing activities and distractions as much as possible, and keep the atmosphere pleasant and rewarding--hardly suggestions novel to good teachers or specific to TEC.

We have no basis for making more TEC-specific recommendations for teacher activity--before, during or after the show--which would enhance children's participation and, thereby, their learning. What we found in our pilot study still holds: there was very little variation in the TEC-related behavior of the teachers in the classrooms we observed. Because we told the teachers we were interested in the children--which we were--we think the teachers understandably felt they could contribute most by "leaving the children to us". It probably would be necessary to manipulate the variable of teacher role more deliberately in order to study its effect.

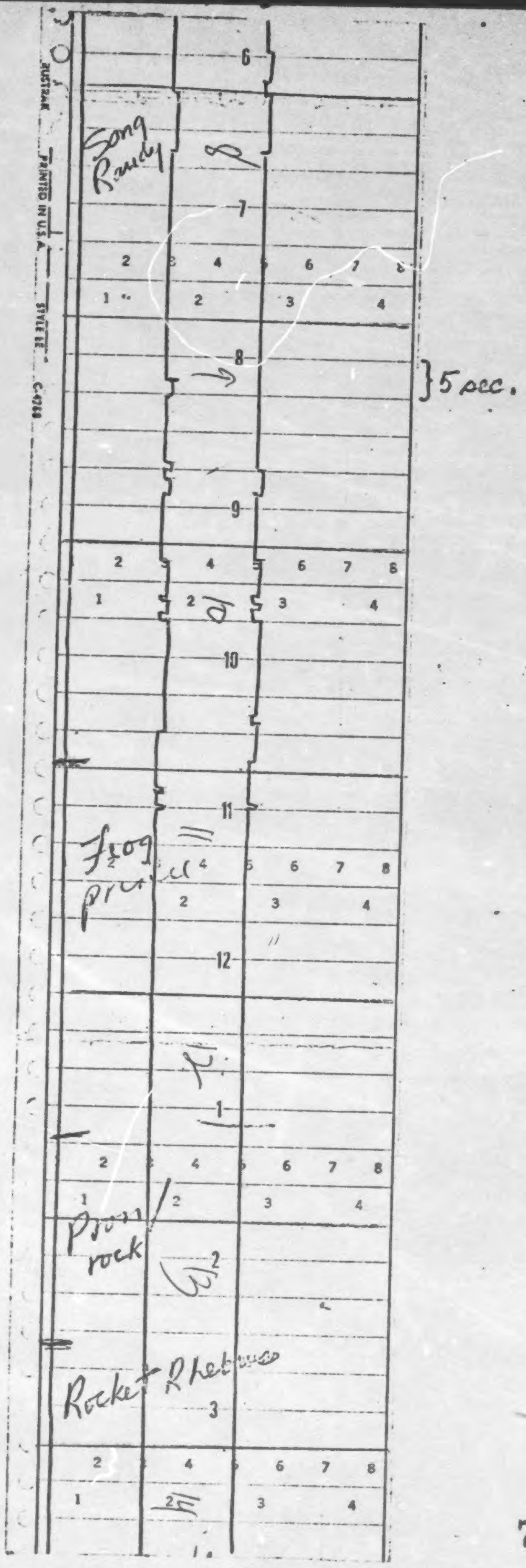
There are other interesting questions which we did not answer. We mention them again here as reminders of possible foci for future research:

> compare behavior while watching TEC with other non-reading TV shows seen in schools;
>
> compare behavior while watching TEC with other non-TV reading lessons;
>
> relate TEC observational data, especially the number of reading responses, to gains in reading achieved from watching the show.

TEC GROUP OBSERVATION SHEET

Teacher Frank
Observer Cazden
Date: May 3
Show # 174
# children at beginning 20 + 1 at nurse
(note any changes in base #)
teacher place at beginning

SEGMENT	NUMBER watching	ALTERNATIVES - number & activity	TEACHER - comments & activity
Opening ID :47	7/20	Children rearrange themselves onto mats in front of (almost under) TV, sitting on or at nearest row of desks.	
ack Frost blend)	12/20	1 child reading own paper	Teacher standing at back
3:21	17/20	2 children reading own paper	
	15/20		
	13/20		
	16/20		
	12/20		
	14/20		Sound occasionally poor
ridge :30			
ther ture 1:37	13/20		
	18/20		Teacher tries to fix reception and steps to TV standing to hold antennae
	15/20		
ld :52	19/20		
ot/feet rector :33	20/20		
idge :09			
ft :14	15/20		
ft out :37	19/20		
swift shift the left:28	20/20		
stract idge :10			



Appendix A2

205 second segment of event recorder tape for show #256 in Brown classroom

Button 1 - show segmentation by GO

Button 2 } same child
Button 3 }

(Event recorder lines have been blackened with pencil for recopying.)

Observer: [illegible] May 17 [illegible] Sheet button 3

[illegible]	[illegible]	COMMENTS
[illegible] 1:17	R_4 / R_3 / R_4 C-ugh C	
[illegible]		Kids anticipating outcome.
[illegible] :17	R_{II}	
[illegible] 2:00	R_{III} C	Kids getting restless but not mine!
[illegible] 1:20	E (I love jelly apples)	Very Positive reaction Much eating imitation laughs
[illegible] 1:00		Gets up + lks around
[illegible] :15	R_5 (perfect)	
[illegible] & Them		
[illegible]		

Appendix A4

Comparison of Verbalizations Recorded by Observer and by Wireless Microphone

MARY (age 6-7, bright, non-reading, attending private school)
listening to TEC, #139, 11/2/72.

From observation six feet away	From wireless microphone worn by child
The Electric Compnay next! (looking away)	The Electric Company next! (singing along without words) (shadowing voice)
sidewalk!	sidewalk!
sidewalk!	sídewalk
walk	sidewálk
	k! (only reading last of the letters)
(singing along)--on	on--power
--power	way--bring you the power
(sometimes not watching)	
139	139
(hand to mouth)	
hello, hello, hello!	hello, hello, hello!
____________________?	Here's a new person
Now you've done what?	Now you've done what?
(response to question)	
The doctor is	The doctor is (repeats)
The doctor is	The doctor is (shadowing)
The doctor is hop	The doctor is hot (incorrect)
	The doctor is hot (p?)
	hop
	hop (shadowing)
The doctor is hip	The doctor is hip
	hip (shadowing)
	The doctor is hip
The doctor is hip what?	The doctor is hip what?
What happened to his hip?	What happened to the doctor's hip?
	The doctor's hip
	What happened to his hip?

	Head	
The doctor is head (hid)	The doctor's head	
Hooray!	Hooray!	
Hooray!	Hooray!	
hip (trying to sound out hippopotamus)..	hip-	
h!	h!	
(limerick in clouds)	(making non-verbal sounds to songs)	
(ow-on)		
(picking at gums)		
(mouthing) "ow"		
(looking away)		
Don't turn around (in response to another child who watched before)	Don't--turn around	
________________(too fast)	vocal noises	
_______ My mother is (to Nikki)	(irrel.) My mother is	
fly!	fly!	
	fly!	
	fly!	
ing	flying	
	ing	(with voice response to bell sound)
ring	ring	
	ring	
________(saying words of song with Cinderella's song)	(non-verbal sounds accompanying Cinderella's song "If I had an ing")	
ing!	ing!	
Stip→ Stop (when another child said) (then read whole thing)	Sssss-ip, sip	
	Stop-reading-my-sign (shadowing voice)	
	Stop reading my sign.	
a-l-k	a-l-k (k before voice)	
Don---t	Donnnn-t (anticipation)	
Don't throw rocks (after another child)	Don't throw--rocks (after voice and another child)	
at	at (after voice)	

(song)	aaa (?)
wow! (after)	wow!
wow (before)	wow
(tel call re Crank)	(irrel.) no, I don't (?)
(re period?)	(irrel.) aaaa (?)
(says something to Jenny)	____________________(to Jenny)
oooh! (gesturing like character)	oooh!
The Electric Company	The--Electric--Company

Appendix B

Descriptions of 10 classrooms

Ames

Cazden (from interview)
with Westcott, GO)

Grade level: 2
Size of Class: 21
Composition of Class: no visible minority group children
Average reading level: 32.9 percentile

Transition to TEC: The previous activity was usually a writing assignement which had to be handed in or put away before TEC. A committee of 2 - 3 children would get the TV. Everyone had to turn their desks to face the TV, and a row of chairs was put in front of the TV for those children whose desks were too far away. These arrangements were well organized and ran off smoothly.

During TEC: The TV was on a high stand and there was not always good reception. No child ever enganged in any alternative activity, and no one ever asked to do anything else except go to the bathroom. No one even opened his desk. It was absolutely quiet.

The teacher sat in the back of the room except when going over to discipline individual children. Her comments to them were not audible to the observer, but on the average of once per observation she went over to talk to a child, invariably a boy, who was yawning or restless. Only once, before the show, did she speak to the class as a whole about their behavior, singling out three children for special mention. While sitting in the back of the room, she often smiled and laughed at the show.

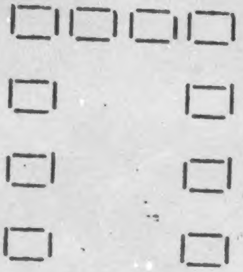
Brown

Smith (GO)

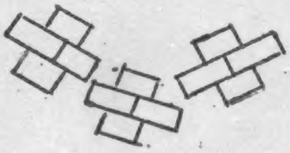
Grade level: 2
Size of Class: 16
Composition of Class: includes 3 Black, 1 Indian, and 1 child of mixed ethnic background. Sex: 11 boys, 5 girls.
Average reading level: 45.2 percentile.

Transition to TEC: During the first few weeks, the children watched the Channel 2 program that precedes Electric Company. The last three weeks just before and as program began, the teacher settled everyone down and supervised the passing out of milk and snacks. Quiet and staying in one's seat were gently but firmly insisted upon.

During TEC:
Seating Arrangement. Initial programs



Last three weeks - desks and chairs grouped



The TV is on the wall in the fron of the classroom, near the ceiling. Reception was poor at times but in general ok.

It was clear that the general expectation for the class was that they were to watch the show and respond or not as they wished. Alternatives were not set up, but children were allowed to find their own, i.e. take material from their desk and read or write etc. Mobility was limited to getting out of seats to throw a milk carton or snack papers in the trash (which was done by one or two children during a program). Once or twice some children got out of their seats to dance to a particular segment - nothing was said but it was apparent that such behavior was not encouraged.

The noise level was low - generally the classroom was very quiet. Children were allowed to (and did) read, sing and comment on the show in normal voices but a great deal of the time nothing was said, or things were said quietly. Children were also allowed to whisper to friends near (though for a short time only). Great glee and much noise was expressed (and tolerated by the teacher) when segments such as Letterman appeared!

Other comments. There was no activity related to TEC at other times during the day.

Cole **Cazden (CO)**

Grade level: 3
Size of group: 24
Composition of class: no visible minority group children
Average reading level: 20.0 percentile

Transition to TEC. The class always watched the preceding Channel 2 show, a science program. Another class watched it with Cole's children in Cole's room. At the end of the science show, the other class left, and without even a "stretch", Cole's children gave TEC their very high attention. Only once was there a different preceding activity. Instead of watching TV, the teacher was reading a story to the children as we entered, and then the children had to turn their desks 90° to face the TV, i.e., desks normally faced the blackboard but were turned for all TV watching and then turned back.

During TEC. The TV reception was excellent. All children sat in their own seats, and rarely did anything else but watch TEC. Once one girl started writing down words from the show, but this did not spread to other children or other weeks. The children responded actively to the show, reading, laughing, and talking to each other, presumably about the show, at segment breaks.

The teacher sat at the back of the room, or on the window sill. She rarely commented on the show, audibly or to individual children. During several observations she was summoned by the intercom and left the room for a few minutes. Except when children turned to watch her leave or return, her absence seemed to have no effect on the children's behavior. The teacher's general "air" is one of confident firmness in a very pleasant way.

Other comments. The teacher asked about the teacher's guide and so we sent her a set, and a list of the order of reruns at the beginning of the spring observations. The second week she said she planned to use the Robin Hood cross-word puzzle. The next week, a girl showed me an album of TEC songs she had received for her birthday, and Cole said they had played some of the songs in class. Whether this use of TEC-related materials at non-show times continued is unknown.

Dean **Darr (GO)**

Grade level: 2
Size of class: 22
Composition of class: all white; 14 girls and 8 boys.
Reading level: 47 percentile.

Transition to TEC. On the five days we observed this class, their activities just prior to watching the show always involved the whole class: reading aloud from Weekly Readers, talking about a trip planned the next day, and on two occasions, finishing a morning of reading testing.

Conditions during TEC. The classroom, located in one of the school's portable annex buildings, is well lit and very pleasant. The children sit at desks in rows, facing the teacher's desk. The TV, which is always in the room, is centrally placed on one side of the room. The children either turn their desks to watch the show or sit on top of the desks.

Watching the show is the only expected activity in this classroom; no alternative activities are encouraged. The teacher watches the show with the children, usually from a desk at the side of the room. The mobility of the children and the classroom noise level during the show (other than reading responses) are extremely low. The teacher will ask children to be quiet if they talk loudly, but the atmosphere is not one of regimentation or strict discipline. The children enjoy watching the show, and are generally not restless or noisy.The teacher is a fairly calm, undemonstrative woman and her classroom seems to reflect this.

The children seemed to be clearly interested in the show and participated quite actively by reading aloud and singing along. Although the teacher does watch each show with them she is not an active participant; she does not comment or ask any questions during the show. She also never made any comments to us about the show itself or whether she incorporated any of its material into her classroom discussions or activities.

Earl **Darr (GO)**

Grade level: 2
Size of class: 26
Composition of class: 15 boys and 11 girls.
Average reading level: 34 percentile.

Although this classroom seems much too small for 26 children and all their necessary equipment, the atmosphere in the room is so comfortable and the teacher and children so pleasant that we, in spite of all our own equipment, felt very welcome here. The teacher has arranged the desks in five small circular groups, which allows for some informal interaction among the children in spite of the cramped conditions in the room.

Transition to TEC. The TV is wheeled into the room for each show by one of the children and placed at the front of the room between some desks. The children remain seated at their desks to watch the show except for those few children up front whose view was blocked and who would move to the back of the room. One has the feeling at this point that with all the children, their desks, the teacher, her student teacher, the TV, we three observers, and all our equipment, this classroom cannot hold one more thing in it. It is clearly not a situation conducive to anyone's mobility.

During TEC. Watching the show is essentially the expected activity, but the limited space does not really allow for many alternatives. The children were usually engaged in a reading or writing lesson before the show started and the materials would not be put away for the show. This would affect attention to a certain extent because some children would choose to continue their reading or writing rather than watch. This, along with talking among small groups of children, is not discouraged, unless it should become disruptive which it never did. During the show the teacher sits at a desk at the back of the room and does some written work, occasionally watching but making no directed comments. The children seem to enjoy the show, but if they choose not to watch they seem to be able to occupy themselves quietly. The atmosphere in the room is not restless or noisy.

Other comments. The teacher clearly enjoyed seeing us every week and would always spend some time after the show talking to us about what the class was doing or about a particular child we were observing. She had the children show us some plants they were growing for their science fair and invited us all to come. We were encouraged to talk to the children if we wanted; they would tell us they watched the Electric Company at home also, and asked us about what we did. Both the children and teacher were very friendly and open, and told us they really looked forward to Thursdays and our coming.

On our last day of observing here the children sang some songs for us after the show was over, and the principal of the school invited us to a lasagna dinner cooked by a fourth grade cooking club. Everyone seemed to know the "people from the Electric Company" and thought it was great fun having us there. Both the pleasant classroom atmosphere and the relaxed atmosphere of the whole school made the observation experience here a very enjoyable one.

Frank Cazden (CO)

Grade level: 2
Size of class: 20
Composition of class: no visible minority group children
Average reading level: 29.1 percentile.

Transition to TEC. Desks in this room are in rows facing the blackboard. They were not moved for watching TEC. The teacher had to get the TV from the hall and wheel it into the room. At least half the class would then come up and sit on the floor between the TV and the nearest row of desks. The rest of the children sat in their chairs or on the desks. Those on the floor sat or lay down, and there was often the kind of distraction when children are touching each other on the floor.

During TEC. The teacher stayed at the back of the room unless the reception became poor, and then she would come up to fix it, sometimes staying to hold the antennae with her hand. This teacher seemed to be watching TEC only because of our presence. And, although she was extremely friendly with us, she didn't seem to mind if children did other work quietly at their seats: sewing, reading, writing or putting their heads on their desk.

Grant **Darr (GO)**

Grade level: 2

Size and composition of class: this classroom situation is different from any of the others we observed in that three separate classes all watch TEC together. Grant's class, whose room is used for watching the show consists of 8 children, 5 boys and 3 girls; white, Black and Puerto Rican. Of the other two classes that came to watch TEC, one had 9 children, and the other was a "special" class of 5 boys, all of whom were designated by their teacher as "educable". This made a total of 22 children and 3 teachers.

Average reading level: 32 percentile.

The five "educable" children ranged from the end of kindergarten to the middle of grade 1.

The room is extremely large for only ten children. The teacher's desk is at one end of the room by the door; the children's desks are lined up in small rows facing her desk. The TV is at the other end of the room, and was usually there when we arrived, although one or two times it had to be wheeled into the room. On one side of the room are two groups of desks pushed together to form display tables. Also, in the corner is a book case and what appears to be a reading area, with small movable pieces of carpet on the floor, The other side of the room by the windows has another group of desks, and a felt board set up in one corner. This is the basi physical arrangement of the room. There are no specific activity areas in the room other than the reading area, and there are essentially no materials available to the children to use other than these of the particular day's lesson.

Transition to TEC. Each time we came into the classroom to observe, the original ten children were usually seated at their desks doing a lesson with the teacher. By the time the show was about to begin, the other two classes would have arrived from downstairs. All of the children would get a piece of carpet from the corner and sit on it in front of the TV; only two or three children would sit in chairs to watch the show. During TEC, the particular seating arrangement seems to have affected watching activity. The children were usually scooting all over the floor on the pieces of carpet, sliding under desks and tables, bumping into one another, and often would end up rolling all over the floor, wrestling, and wrapping themselves to varying degrees around the legs of nearby chairs. It was therefore almost impossible for those children who did want to watch the show to avoid getting bumped by those who did not want to watch.

Although none of the three teachers required their children to watch the show, there are really no alternative activities or materials in the room available to the children. Perhaps what is most characteristic of the activity in this classroom during the show is its disruptiveness and rather aimless disorganization. In spite of the number of children who do not want to watch the show, and the high energy and noise level in the room during the show, nothing is really happening with these children. They are either rolling around on the floor or wandering around the room as if looking for something to do but not really finding anything Occasionally a child would color at his desk or look at a book, but the majority of the children did not do either of these activities. Often during the show, and usually afterwards, children would approach the three of us to talk and to examine our equipment.

Each of the three teachers interacted somewhat differently with the children during the show. They seem to have a rotating-type system among them whereby one will stay with the class while the other two leave for a while; one will then return to allow the first teacher to go, and so on. Usually for the final third of the show all 3 teachers are present in the room.

The children are generally noisier, more restless, and less attentive to the show when the teacher whose room it is leaves. Neither of the other teachers involve themselves very much with the children, unless things become extremely disruptive, at which time they will reprimand a particular child. They do not interact with any of the children or direct them to other activities, unless it is to tell someone to go back and sit down. They usually do n t watch the show, but will often knit, do some paper work, or talk among themselves at the back of the room. The teacher whose room it is seems to exert more control over the children by her presence alone than by any specific disciplinary remarks or reprimands directed at the children. Although the noise level and general mobility decreases when she is in the room, those children not watching still do not engage in any kind of meaningful alternative activities.

Other comments. The "head" teacher is extremely pleasant and would often talk to us after the show about the children, and answer any questions we had at the time. All three teachers seemed to be concerned about the show's moving to an earlier time slot in the fall, particularly since the new time will coincide with the school's lunch hour and the children will not be able to watch. All three teachers seem to feel that the show is an important classroom activity and one they would not want the children to miss. We encouraged them to write letters to the Electric Company expressing their feelings about the time change, and apparently each of the teachers, and some of their students, did this the following week.

Hall Darr (GO)

Grade level: 2
Size of class: 19
Composition of class: 12 boys and 7 girls, all white.
Average reading level: 56 percentile.

The classroom itself is large and very bright; the children's desks are loosely arranged in small groups in the center of the room- There is ample space for children to roam around the room and to engage in a number of different activities simultaneously. Although the physical arrangement of the room seems fairly flexible, three of the four corner areas seem to be set aside as small-group activity areas, where children can lie on the floor and read, play board games, build models with different materials, listen to records, or do just about anything they choose without disturbing other groups of children. Along the wall by the windows there are one or two tables which can be set up for specific activities. At least two of the days we observed, a game of checkers, and some clay figures the children had made - possibly chessmen - were set up on these tables. Along the back wall of the classroom is an aquarium which the children seem to be free to explore. One back corner of the room leads into a storage-type closet. Often during a show a few children would wanter into this area to get board games which they would bring back to the room to play. Also towards the back of the room are two large teacher's desks, one of which was usually covered with different materials. At times the teacher would sit at the other desk to do written work or to give individual help to a child during the show.

Transition to TEC. At the start of the show the TV is rolled into this classroom from the classroom next door. Apparently both classes watch The Electric Company so they each use the TV on alternate days. The TV is placed near the front of the room, and those children who want to watch either sit on the floor near the set, or pull desks and/or chairs near it. This arrangement does not seem to interfere with any of the other activities going on in the room; the children can easily move from the TV area to any other activity area, and vice versa. the TV can also be seen fairly well from most other areas of the room. If a child is playing on the floor in one corner, he can stand where he is and see the TV; if he becomes really interested in the show he usually leaves the activity area and walks over to the TV area for closer viewing.

During TEC. Although the numbers varied from day to day, a basic viewing pattern for this class would usually involve a core number of children in front of the TV, and small groups of children engaged in different activities around the room. Periodically during the show children would switch activities, wander near the TV to watch, go back to an activity, watch some more TV, and so on. Sometimes a few children would be engaged in paper work at their desks rather than in one of the activity corners; they too would periodically leave this to watch the show, either by just looking up at the TV or by walking over to the viewing area.

The children were engaged in a lot of different activities the first two days we came to observe. On both of these days, the teacher called them away from these activities to tell them they could watch the show if they wanted or they could continue at whatever they were doing, but they could not disturb those who chose to watch. It is possible that attention on these days was higher than it would have otherwise have been, due to both this specific mentioning of the show and to the novelty of our presence.

On the third day we came to observe, the class had just returned from a trip to Children's Museum. A number of children brought back with them small toys and paper objects, and much of their alternative activities on this day involved playing with these small objects at their desks.

The fourth day of our observations had the highest percentage of children not watching the show - 76 %. This could probably be attributed to a number of factors; the children had been seated watching a film for 1 - 1/2 hours just prior to the Electric Company. Although not many watched the show on this day, they all did engage in specific activities throughout the room and did not wander about restlessly. Also, the regular teacher was absent on this day, which left the supervision of the class to her two assistants (who had also been there the previous week.) It is possible that the absence of their regular teacher affected the children's watching activity. Neither of these teachers made specific mention of the show when we came in, other than to ask someone to roll in the TV for the Electric Company.

The regular teacher was also absent on the fifth day we observed; the children were making get-well cards for her when we came in. Most of the alternative activities on this day centered around the get-well cards: finishing them, putting materials away, wiping paste off desk tops, and sharing the cards with each other.

It is interesting to note that on the last day of observations the regular teacher was back in the classroom, and the percentage of inattention to the show that day was back down to 7 % - the lowest figure for the six days.

The role of these three teachers during the show varied each day, but basically none of them constantly watched the show or made any directed comments about it. Each of them would be involved in different activities during the show, both with and without children. They would leave the room at various times, sometimes with a few children following. On the two days the regular teacher was absent, one of the assistants would wander from time to time to different activity areas in the room, but usually at the particular request of some children. For the most part these teachers were engaged in their own activities, with periodic moments of show-watching.

It is important to mention one additional factor which probably affected the children's attention and added to the general confusion: the end of the show at 2 p.m. coincided with the end of the school day. On each day a few children would inevitably become restless about mid-way through the show, make some comments about its being time to go home, or begin gathering their things together. Also, the teacher would sometimes use these last few minutes to make an announcement to the class. Because of this increased activity at the end of the show the children's attention may have been lower than otherwise expected.

Ingram Kattef (IO)

Grade level: 2
Size of class: 17
Composition of class: mixed ethnicity: Italien, Armenian, and Irish, 1 Black girl.
Average reading level: 85.3 percentile

Transition to TEC. The show is preceded by recess. The teacher turns TV on either when the class comes in or just before. She does not make any comments regarding the show beforehand.

During TEC. The children sit wherever they are comfortable; generally they are grouped together in front of T.V. on the floor, on desks, and on chairs.

The TV is placed in front of the room, a black and white set, large, with excellent reception.

The children are allowed to choose alternatives to watching. The alternatives are not set up beforehand, but seem to be understood. There are specific places to do things, i.e., reading corner, math games and other game areas. The children have no trouble choosing something to do and seem used to making these kinds of decisions. A number of children choose to watch each time. Generally there are 2 or 3 reading to each other in the reading corner; 2 or 3 working at their desks on art or work from earlier in the day; and 2 or 4 playing games. They move about freely and there is a minimum amount of noise. The children working on alternative activities often watch the show at various times.

The teacher remains in the background. She watches the show, speaks to children who come up to ask questions about things they are doing; or talks with the student teacher about plans. She seems to have good control over the class without having to say anything directly to them.

School is out at 2.00, The Electric Company is the last activity on the day we watch.

Other Comments. Teacher was not using TEC guide or watching the show before we asked her to. She did watch some 21" classroom shows earlier in the year. The class also had a higher reading average than other classes we have used.

Jones

Cazden (GO)

Grade level: 1
Size of class: 14
Composition of class: 10 girls and 4 boys; 3 Black children and one Puerto Rican child.
Average reading level: 60.6 percentile

The children sit at tables grouped into squares, some children facing in the walls, some the window, some the blackboard. The teachers desk is near the windows. Materials for a variety of activities are all around.

Transition to TEC. Other than turning on the TV, there really is no "transition". Nothing special is said, and children continue doing whatever they had been doing, and start new activities when they finish. The TV is mounted into the classroom wall, and is often not loud enough to be heard easily over the hum of other activities. Sometimes a few children brought their chairs up close to the TV to watch; but generally they watched from wherever they were, tuning in and out.

During TEC. With the exception of one day, there were always a variety of alternative activities taking place: playing cards, coloring, writing, doing arithmetic papers, looking at books. The one exception was when everyone had been sitting at desks doing arithmetic when the show was turned on. The teacher said to them, You can do 2 things at the same time - TV and arithmetic. So the only movement in the room for most of the program was back and forth to the teacher's desk to have the arithmetic papers corrected. The teacher explained to us afterward that "We had a mixed up day today, so we didn't get to math in the morning."

During the show, the teacher usually sat at her desk, sometimes watching the show, always ready to talk to children who came over to her.

Other comments. In February when we visited this classroom, the teacher was developing her own show related activities. She referred to the weekly Guide while making her lesson plans for the following week in order to see what would be of interest and relevant to the reading program. She said that during the show she would point out those relevant segments to the class. We do not know if she continued to use the show this way in the spring.

Appendix C1

Chart of Classes, Dates and Shows Observed, with % Inattention for E_ach Observation

% Indication	4/23 #151	4/24 #152	4/26 #154	4/27 #155	4/30 #171	5/1 #172	5/2 #173	5/3 #174	5/4 175	5/7 #176	5/8 #177	5/9 #178	5/10 #179	5/11 #180	5/14 #256	5/15 #257	5/16 #258	5/17 #259	5/18 #260	5/21 #131	5/22 #132	5/23 #133	5/24 #134	5/25 #[illegible] 259	5/29 #132	5/30 #135	5/31 #139	6/1 #140	6/4 #161	6/6 & 6/7 # 173 # 207
Ingram 28							31%					15%					42%					11%				35%				
Dean 95.6		3%				7%					2%					7%					3%									
Jones 69	73%				25%					38%										73%					25%				66%	
Frank 19			19%					13%					20%					17%					20%				24%			
Grant 34				23%					42%					24%				42%	24%									50%		89
Earl 8			5%					7%					7%					12%					10%				5%			
Anies 2				3%					1%					3%					3%					2%				1%		
Brown 12					11%					15%					10%					13%									5%	10%
Hall 28							13%					3%					7%					7%			30%					79
Cole		3%									5					6					3			6						

notes : show 259 was watched twice because on 5/25 channel 2 mysteriously showed it in stead of scheduled 135 ; shows 161 and 207 we took into classrooms with video-tape on June 4,6,7.

Appendix C2

Weekly Observation Schedule

Mon.	Tues.	Wed.	Thurs.	Fri.
Brown Smith (GO) Rosansky Flagg	Cole Cazden (GO) Chen Rosansky	Hall Darr (GO) Andrews Smith	Frank Cazden (GO) Smith Flagg	Ames Westcott (GO) Rosansky Rose
Jones Cazden (GO) Chen Andrews	Dean Darr (GO) Rose Flagg	Ingram Westcott (GO) Rose Kattef	Earl Darr (GO) Kattef Chen	Grant Darr (GO) Kattef Andrews

Note that Cazden, Darr and Westcott were always GOs, Smith filled both GO and IO roles; others were IO only.